

T H E
BEE-MASTER's COMPANION,
A N D
A S S I S T A N T.

Wherein is set forth the properest Methods of managing those Insects, so as they may turn out to the best Advantage. Shewing an effectual Way to preserve them from Famine, Cold, Robbers, Mice, or other Enemies: also how to make all your Hives equal in Bees, so as never to have any weak Hive; with an Account of the Power the working Bees are invested with, of raising any Egg in the Hive to be a Queen, when the Community stands in Need of One.

By JAMES BONNER, *B*
Bee-Master, Auchencrow, near Berwick upon Tweed;
Author of Practical Warping made Easy.

I am come to bring them into a good land, a land flowing with milk and honey.

He spake also of beasts, and of fowls, and of creeping things, and of fishes. ANCIENT HISTORY.



B E R W I C K:

Printed by J. Taylor, for the Author; and sold by him,
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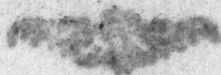
T H A T 2 1 2 2 A

When I see the property of others
 and their losses, to be very near me to the
 self advantage, showing an efficient way to
 save them from famine, cold, Rabbies, etc.
 other business: also how to make all your lives
 and in brief, to be able to have any want, illness,
 with an Account of the Power of the other lines and
 involved with, of making any thing in the line to be
 a Quest, when the Government finds in Need of
 One.



By JAMES
The Master, Auctioneer,
Auctioneer of the
The Master, Auctioneer,
Auctioneer of the

1 was found to have been a good land, a good horse
and a good man and woman.
The whole of the land, and of the
land, and of the land.



Printed by J. Taylor for the Author: and sold by him
and Mr. Nelson, Bookseller, in Warwick; and
Mr. Nelson, Bookseller, in Leicester.

RECEIVED

T O

ALEXANDER RENTON,

OF LAMBERTON, Esq;

THIS Treatise is most humbly dedicated as a Testimony of Thanks and Gratitude, for his encouraging the Publication of this Work; and other Favours received from him,

By his

most humble Servant,

JAMES BONNER.

ALL XANDER BEN OF

OF LAMBERTON

THIS I vouch and certify that the

copy of the said and certain for the

conveying the situation of the said

document received from him

For

Witness my hand

JAMES DOUGLAS

P R E F A C E.

THE writer of the following pages has been almost from his infancy an admirer of bees. When a boy at school learning to read, he used to read with delight the promises made to the children of *Israel* concerning the land of *Canaan*; especially when it was said to be a good land, a land flowing with milk and honey. When appointed by his father to watch his bees in swarming time, he esteemed it a happy employment, and thought he was in a kind of paradise when running among the bushes and seeing the bees swarm. When very young he purchased three hives, and ever since has had a pretty large stock, and taken particular delight in studying and working about them for near twenty years past; in which time he has perused all the authors in the *English* language he could come at, and tried multitudes of experiments upon them.

He is also very sensible that there are a great many treatises on bees already, and that they contain a good many useful observations and directions; but he is also certain that they are defective and even erroneous in many points; and that the culture of bees in this country has never arrived to near that degree of per-

fection they might, in case they were properly understood and reduced into practice. Were we to consider the vast millions of melliferous flowers which perfume the air in the honey season, particularly the white clover, which justly bears the major part in many of our pasture lands; and the mustard of all kinds which is interspersed among our corn fields, together with the vast quantity of flowers in large heather muirs. It may justly be said, how large and good is our pasture, and where are our flocks to feed on them.

Bees are well worth our care and attention, for their honey and wax is beneficial to the health of man. Their wax also is now become the greatest supply of light in polite assemblies, and thereby is become a considerable article in commerce. Bees when properly managed, bring to their owner yearly a considerable profit, and that without either rent or tax, and with little attendance.

The culture of bees, says one, is a branch of rural œconomy, the more valuable as it is within the reach of the poorest cottager; it requires not plowing, manure, cattle, nor rich meadows. The whole that is wanted is an attendance which may be given by the meanest, and that but for a short time, in this respect it is really reaping without sowing.

Certain it is, if bees were properly managed in this country, for every ^{hive} we have we might easily have a score. The principle reason hives are so thin and far between in this land, is the want of a proper knowledge of them; particularly Bee-masters in setting aside their stalls, they

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they often keep such hives for them that have neither a sufficiency of honey nor bees to preserve them from cold, robbers, and famine till *June*; and if their hives fall a prey to these enemies, as too often they do, they draw a wrong inference, and conclude that bees will not thrive with them, and the owners immediately consider if they have fallen out with some wrinkly browed old woman, or suspect they are not in good blood with witches and fairies, being loth to impute their loss to their want of management; they cannot endure that assertion of *Cardinal Richlieu*, that imprudent and unfortunate are two words representing the same thing: therefore they say, that at best they are but precarious goods, and often never try them more; whereas the alone cause of their ill luck was their own bad management in keeping bad stalls. Again if a hive of bees takes any dis-thriving in winter, spring, or summer, they can do nothing to make her thrive again; but if they will take the directions in this book, they will see in page 22, 23, 85, how easily they may be made to thrive again.

Our seasons being very precarious in this country, thereby many of our swarms in some summers cannot lay up as much provision as will supply them till the return of the next summer; but it seldom happens that a Bee-master cannot select as many good hives out of his own apiary as will supply him for stalls. For example, supposing in one parish there are ten Bee-masters, each of whom keeps three stall hives in *September*, which are thirty stalls in all: the next summer happens to be a remarkable
bad

bad one, much cold and rainy weather, so that of all the thirty stalls there will be few swarms; and the whole ten Bee-masters one with another can only set aside thirty stalls again, by which their stock will be nothing increased. However they probably will have got some light hives, which will perhaps recompense them for their labour, and by which they will still be no losers as they paid no rent.

The next summer goes on the other happy extreme, and is very warm with soft showers now and then, and the thirty stalls with their swarms in harvest are perhaps increased to about seventy, sixty of which are fit for stalls; but taking our summers at an average, a good stall will swarm once, and be good herself still; and if you smoke one of them for your use, she will have 20 lb. of honey, which is no small gain to be got with so little trouble and almost no expence.

In order to make as much of bees as we can, I would advise that in every village there should be at least twenty stalls, and in every stead six, and where there is a large distance between villages, six hives may be set within a quarter of a mile from one another, as directed in page 73.

From all which we may see how easily our number of bee hives may be increased in this country.

It may also be observed that what honey bees collect from flowers, do not injure them; therefore it may be said to be money made out of nothing.

If the directions given in the following pages are properly taken and practised, it is hoped that the

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the increase of bee hives and honey in this country will be more extensive than formerly, and that every *Briton* may be supplied with the honey collected from the flowers of his own farm or neighbourhood, which will agree better with his constitution, than that which requires his cash to bring from foreign countries, some of which is scarcely palatable.

The author not having the advantage of a grammatical education, hopes the candid reader will overlook mistakes of that kind, and any inaccuracies of language.

THE

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E R.

E R R A T A.

Page 51. l. 9. for Drones read Bees.

Page 73. l. 11. after Mr. read Stephen.

Ditto l. 27. for twenty read two.

Page 106. in the note, after stalls read except
the three that were 30 lb. wt.

Page 155. l. 30. for 100 read 1000.

THE

T H E
BEE-MASTER'S COMPANION,
A N D
A S S I S T A N T.

C H A P. I.
OF THE PLEASURE AND PROFIT THAT ATTEND
THE KEEPING OF BEES.

BEES, those emblems of virtue, have been the study and delight of wise men, and have employed the ablest pens in many nations, and in different ages.

We find, in the sacred writings, the land of *Canaan* spoken of as a good land; and as a proof of its being so, it is said, it was a land flowing with milk and honey.

Among the ancients, *Aristomachus* contemplated them for the space of fifty-eight years; and *Philiscus* retired into woods, that he might have more convenient opportunities of observing them: *Aristotle*, *Virgil*, *Pliny*, and *Xenophon* wrote upon them. Among the moderns, I shall just only mention *Purchas*, *Rousden*, *Geddie*, *Butler*, *Warder*, *Bradley*, *Thorly*, *Thomas* and
B Daniel

2 *Pleasure and Profit of keeping Bees.*

Daniel Wildman, Stephen and William White, and Keys, all Englishmen, and Robert Maxwell, a Scotchman, all of whom have published treatises on them; the most part of which have appeared within this century: and they have given many directions how to manage Bees, according to the knowledge they had arrived at about them.

But the knowledge of Bees, as well as of other things, arrives by degrees; and may be truly said to be yet but in a state of infancy, as appears by the many erroneous points taught by those who have wrote on that subject: notwithstanding their boasted knowledge and large promises in their title pages, as a Complete Guide for the Management of Bees, &c. they have all been strangely misled in their opinion about the generation of Bees, in asserting that the Queen lays three different kinds of eggs, *viz.* one kind to be a Queen Bee, another to be working Bees, and a third to be Drones; which is a mistake, as shall be made appear in the following sheets.

We shall begin with the pleasure and profit that attend keeping Bees, which are the only motives to excite rational creatures to engage in any business.

What is pleasanter than to see a hive of Bees in spring, when the days begin to lengthen, and frost and snow, like birds of darkness, cannot bear the sun? Then these industrious creatures begin to fly about, and dance and sing, rejoicing at the return of the season: then they reform what is amiss in the hive, and as their family is increasing, they omit no opportunity of gathering in fresh provision for their increasing young. How delightful to see them hur-

rying

rying in their yellow loads, in summer! In the honey-season, how diligent to lay up provision for the returning winter! View them in this clover-field, and yonder flowery mead, see how throng they work, and hear how sweet they sing! it is very pleasant to see a swarm of Bees flying in the air, and afterwards forming a young colony on a bush, and increasing their master's stock: and even in harvest and winter, in fine days they make a melodious sound.

Bees, when properly managed, are very profitable, which adds greatly to the pleasure of the poor, as they are rent and tax free. In good years one hive will throw two swarms, in middling years one, and in bad years perhaps some will swarm none at all: but I shall just estimate by moderate years, and allow each hive, one with another, to swarm only once, which value at fifteen shillings, twenty stalls will yield their master fifteen pounds yearly;—no small sum to be got with so much pleasure, and little toil: they will yield that much, although one or two should die in winter. None need think my estimate too high; if their stalls be good, they will have that much one year with another. In summer, 1787, many a one made thirty, and some forty shillings of one single stall; and last year I sold a hive to a neighbour of mine in *March*, and I saw him have five hives out of her in *August*, and he has kept four of them for stalls.

C H A P. II.

SHEWING WHO MAY KEEP BEES, AND THE PRINCIPAL FLOWERS BEES FEED ON.

READER, whoever you are, if by the above chapter you are now inclined to become a Bee-master, you will perhaps want to be informed if such as you can have an opportunity to keep Bees, and have pasture for them. I answer, if you have any property of your own, or can make interest with any friend or acquaintance, to set a hive in; and can only spare fifteen shillings or so, to purchase a hive at first, all is answered; for by the laws of this land, all pasture, however good, is common to every man's Bees: and *Mortimer* observes, "That there is no fruit nor flower, no wood nor forest, no hill nor dale, no fruitful nor unfruitful soil, but what affords them matter to work upon *;" and indeed all parts wherever I was, I have seen heavy thriving hives of Bees in town and country. It is hoped none will understand me in such a light, as if I meant all parts were alike good for Bees to thrive in; very far from it: for although they will do well in all pastures, and fly far for food, yet they will thrive far better when they are in the midst of good pasture, and set in a good stance; which

* Art of Husbandry, p. 191.

which leads us forward to shew what is good pasture for Bees.

Experience has taught us that Bees are very fond of fallows, gooseberry-bushes, whins, kail, or colworts of all kinds, turnips, broom, and plane-tree, all flowering before the middle of *May*: in *June* comes the garden-mustard, wild-mustard, runches, and white-clover, all of them excellent for Bees to work on, and also last till harvest: in the end of summer, and beginning of harvest, are rag-weed, heath, flax, hemp, and a great many flowers in late meadow-grounds; but the principal of all these flowers for honey, are the mustard, runches, white-clover, and heath; off any of which, if a good hive be near them fourteen fine days, she will fill herself full of honey and wax.

There is a great variety of other flowers which bees work on, such as snow-drops, hazel, crocuses, osiers, primroses, violets, daisies, pinks, lilies, poppies, beans, and all kinds of fruit-trees, fitches, elders, ash, yellow-gowins of all kinds, thistles, dock, alders; in short, I know no flower they will refuse when they cannot do better, but when a choice is denied them, like the poor among mankind, they chearfully feed on a coarser diet; but give them their own choice, and they will let you know how little they esteem gaudy trifles, when put in balance with things that are solid and good; for they will skim over our finest gardens and beautifullest flowers, (as below their notice) and dart eagerly upon their beloved runches, clover, and heath.

C H A P. III.

OF HONEY DEWS.

WHAT the honey dew is, is disputed among the learned. According to the ancients, it was an efflux of air, a dew which fell upon flowers. The moderns say, it is rather a perspiration of the finest particles of the sap in plants, which evaporating through the pores, afterwards condense upon the flowers *.

I shall give Mr. Key's account of it in his own words, which seems to be pretty fair, and is as follows :

“ The honey dew is not a liquid deposited by
 “ the air on the leaves of plants, as is generally
 “ supposed; for then, like other dews or fogs,
 “ it would fall on, and adhere to, all sorts of
 “ plants indiscriminately, whereas, it is found
 “ only on a *few* particular plants; and on them
 “ but partially, for the young leaves afford
 “ none.

“ The oak, maple, fycamore, hazel, and
 “ bramble, are, as far as I can find, the only
 “ plants on which it is found. Neither is it dis-
 “ covered, like other dews, early in the morn-
 “ ing; but some hours after the sun has shone
 “ with its greatest splendor, that is about ten
 “ or eleven o'clock; and continues, more or
 “ fewer

* Nature Delineated, p. 190.

Of Honey Dews.

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“ fewer hours, in proportion to that splendor.
“ For cloudy dull days are incompatible with
“ honey dews. This substance is as transparent
“ and as sweet as honey, and is, in fact, perfect
“ honey, attracted through the pores of the
“ leaves, by a peculiar sultry heat; particularly
“ when reflected through clouds. Sometimes
“ it is found on the leaves in the form of little
“ drops or globules. But at other times, being
“ more diluted by the greater moisture of
“ the atmosphere, it covers the leaves, as
“ though they were spread with a fine syrup.

“ The time in which these honey dews are ge-
“ nerally found, is from the beginning of *June*
“ to the middle of *July*. But it will vary in
“ proportion as the weather is wet or dry;
“ which will occasion them to be either sooner
“ or later. The hottest and driest summers,
“ produce the largest and most frequent honey
“ dews. In cold and wet seasons, few or none
“ of them are to be seen. When the year is
“ backward in its fruit, it betokens that the
“ honey dews will be late also; sometimes, even
“ so late as the middle of harvest.

“ *Butler* has a remarkable observation upon
“ this subject: Honey dews, he says, were in the
“ year 1617 produced two months after the u-
“ sual time. There having been a long conti-
“ nuance of wet weather, no honey dews were
“ found until the latter end of *August*; which
“ proved exceedingly hot. But the quantities
“ were small and of little service. For the
“ stocks when taken, proved light: and most
“ of the stocks and swarms that were kept,
“ died for want, before the end of winter; ex-
“ cepting

“ cepting only in the heath countries ; where
 “ the heath being then in full flower, afforded
 “ the Bees that plenty of honey which could
 “ not be obtained from the honey dews.

“ Whenever a honey dew is found, the Bees
 “ are so extremely eager to fetch it, that they
 “ quit all other work, that their returns may be
 “ the quicker and more numerous ; and lest a
 “ gloomy change should deprive them of the
 “ precious prize. No harvest swain, dreading
 “ impending storms, can be more anxious, or
 “ expeditious, in hastening the housing of his
 “ crops, than these aerial tribes in this their de-
 “ lightful office ; so much so, that thronging in
 “ too great numbers at the door-way, they jostle
 “ and tumble each other down. And smart-
 “ ing woe to those who shall thoughtlessly stand
 “ in their way at this important crisis ! Their
 “ joy on these occasions, is expressed in such
 “ incessant and loud notes, as to be heard at a
 “ great distance. By these tokens it may be
 “ known there is a honey dew, without seeing
 “ the trees from which they gather it.

“ The Bees of such apiaries as are far distant
 “ from those plants that produce honey dews,
 “ cannot collect near the quantity that those
 “ can that are near. Gardens in particular,
 “ seldom furnish plants of this sort.

“ A very surprising source of honey was ob-
 “ served by the Abbé *Bossier* in *France*. This
 “ he tells us, the Bees collected from the excre-
 “ ment of a small insect called a *Puceron*, vul-
 “ garly a louse, infesting the bark of some par-
 “ ticular trees ; such as holm-oak and the lime.
 “ In the middle of summer they furnish the

“ most

“ most of this excrementitious sweet: in the
“ autumn (though that is the time the Bees
“ have most need of it) but little, and of infe-
“ rior quality to honey gathered from flowers.

“ As I was ignorant whether any thing of
“ this kind had ever been noticed in *England*,
“ and as there are both oak and lime trees on
“ my premisses, I have from year to year, very
“ attentively observed them; but could never
“ perceive any such appearances as described
“ by the Abbé; I must therefore leave this
“ matter to be ascertained by some one who
“ shall be more successfully inquisitive.”

I have seen Bees carry honey dew from plane-
tree, though very rare. An acquaintance of mine
informed me, that he has seen Bees on oak-trees,
working very fast, and ants at the same time
creeping all over the tree, and eating the honey
dew as fast as the Bees; which agrees nearly
with the Abbé *Bossier*'s account of it in *France**.
Some writers believe, that when the liquor
which the Bees collect, has been for some time
in their stomachs, it comes from thence changed
into true honey; the liquor having been there
properly digested, and rendered thicker than
when it entered. Others are of opinion, that
the Bee makes no alteration in the honey, but
collects this delicious syrup just as nature pro-
duces it, and first fills her bag, and then dis-
charges it into the magazine: which last is the
truth, as I know for fact, by my own experi-
ment; for I have often taken a Bee from the
flower she was gathering on, and pulled her
asunder,

* Wildman's account of Bees, p. 80. &c.

10 *Knowledge necessary in managing Bees.*

afunder, to satisfy myself on that point, (although with the greatest reluctance) and found the finest blab of honey in her bladder, as large as a pea, exactly the taste of the finest honey, and also the colour of the honey which that flower produced. I have caught them on runches and clover, and the honey in their bellies was white honey; those I caught on heath, their honey was high-coloured, exactly the taste and colour of heather-honey; besides it is no time in their bellies, for as soon as they are loaded, they hurry home, and pour it into their cells.

One thing observable is, that whatever flower a Bee lights on first, she always continues to work upon the same kind of flowers, till she is loaded, although she should be obliged to fly over better kinds of flowers, and even to some distance: but as there is no general rule without exception, if they cannot do better, they will make up their load of some other flower.

C H A P. IV.

THE KNOWLEDGE OF BEES, NECESSARY TO A
PROPER MANAGEMENT OF THEM.

IT is necessary that every one who commences Bee-master, should have some degree of knowledge about them; owing to the want of which many one lose their Bees entirely; and then they will tell us, it is not every one Bees will

Knowledge necessary in managing Bees. 11

will thrive with; which in some sense is true, for they will not thrive with those that understand them not, neither will take a moderate care about them; no more than good corn can be expected to grow, if the farmer knows not how to labour his ground, and minds not whether his seed be good or bad.

I said, some degree of knowledge about them, for it cannot be expected that every one who may have Bees, can understand them perfectly; as none ever will, unless by good information, great study, and long experience. And I have often thought that the only method to learn to manage Bees, is just the same way we take to learn any other thing easiest, and that is by seeing it done, for example is easier than precept; but as yet that is not the way of learning the management of them in this land; perhaps it may be so in times to come, if ever Bees be improved in such a manner as they might and ought to be.

Therefore I shall mention some of their nature and properties, and point out their diseases and enemies, and shew how to guard against what is prejudicial to them, and instruct to manage them so as to turn out to good account; giving directions how to order them in a plain, safe, and easy manner, which may be practised by new beginners, and those who may not be fit to venture on higher projects.

I shall also give directions to those who are arrived at some perfection in the managing of them, and shew them various methods, which are highly profitable when performed in a right manner; only I give this caution by way of preliminary,

preliminary, that people must beware of being too rash in trying schemes about them, till they understand, and can handle them middling well, lest they make the cure worse than the disease, and find to their smart that every one is not fit to be a Bee-master; for I speak it by experience, that although I spared no expence to get myself properly informed about them, yet I hurt many of my hives in my first attempts in trying experiments; but now I have arrived at that degree of managing them, that I have now no bad hives at all; for whenever they take any dis-thriving whatever, I immediately put them to rights, and make them thrive again: the way I do will be taught in its proper place.

C H A P. V.

GENERAL OBSERVATIONS ON THE NATURE AND PROPERTIES OF BEES.

WE shall go forward to take a view of their nature and properties in general: Almost every one knows that there are three different kinds of Bees in every hive, *viz.* the Queen Bee, commonly so called, the working Bee, and the Drone. Certain it is that Bees were created at first along with other creatures, and that from them all the Bees that ever existed have sprung, (whatever whimsical frolic might enter into *Virgil's* head to the contrary, who alledges, by certain methods used, they will spring from the corruption of other creatures.)

Bees

Bees are of a hot nature, and heat is the very life of them; when they are in the hive, in company, or flying about, they are quick and agile, and fit for business; but in a cold day, when a Bee is separated from its fellows, it soon chills and turns motionless, and if not recovered with heat in a day or two, real death ensues. Every hive of Bees is a distinct commonwealth, that lives in the strictest friendship, and perfect peace and harmony among themselves; for they work for all, they watch for all, and fight for all.

They are not selfish in their aims, but study the public good. Indeed sometimes there will be some commotions in a hive of Bees among themselves, when there are two contending princesses for the crown, but this is a rare case; but though they are peaceable among themselves, they are professed enemies to all other Bees, and also to every other creature.

They are a warlike, heroic, and valiant people: whoever they are that dare presume to come too near their castle, to interrupt their business, or disturb their peace; though an *Alexander*, a *Cæsar*, lion, or bear, all one to them, they will point their poisonous spears, and sound an alarm for war, and attack them in a moment; will neither take nor give quarter, but conquer or die; and suppose they be knocked down, they no sooner recover, than they are at blows again: one can scarcely forbear laughing to see how those little malicious imps, little bigger than a snuff, can have the audacity to attack our noble spirits, and daring sons of *Mars*, and give them battle, and make them run screaming off,

off, tearing their hair, and rubbing their eyes, crying for help in such a panic, as they never dare affront them more.

They are very cleanly, and love to have every thing neat about them, abhorring all filth and impurity; when the cold permits them to quit their warm parlours and dining-rooms, then they set about reforming every thing that is amiss, they mend their waxen partitions, bury their dead, scour and sweep their streets and floors, plaister their walls in the inside, stop up every crevice to prevent the access of cold or vermin, set centinels at their gates, empty themselves in flight. They also live upon the finest food, the purest nectar, as they extract it from the flowers, hating adulteration or mixture, satisfied with the produce of their own industry. “ In painful profitable labours, sure no creature
“ can be more constant and indefatigable, and
“ no less chearful are they herein, than constant; they have a natural inclination hereto,
“ and nothing is more odious to them, than
“ sloth and idleness: labour is their very nature and greatest pleasure; an hungry or a
“ thirsty man doth not eat or drink with greater delight, than these admirable amiable creatures follow their appointed works and employments: this is their beloved province,
“ and now they appear to be in their proper element. With the greatest satisfaction and
“ admiration, have I frequently beheld them
“ most faithfully, and as chearfully, discharging
“ their several offices, without losing the least
“ opportunity: restraint at such a season would
“ make them impatient, and confinement would
“ be

“ be an intolerable punishment. It is to these
“ their united, most earnest, and constant la-
“ bours, their prosperity and riches are princi-
“ pally owing; *the diligent hand maketh rich* *.

They omit no opportunity of doing good; they in the day time work by the light and heat of the sun, for when the sun opens the flowers, and exhales the sweets, then they are keen and eager on work, and hurry in and out of their hives, and deposit their honey in the first empty cell they come at, and to the fields again, and improve their time and opportunity: (they are not like those inverters of nature, who pretend to have full as much wit, who lie in bed when the great candle of nature is shining around them, and rise precisely when it is half burnt; and after it is done, set up their own twinklers, to the injury of their eyes and health) but when night, or a cloudy, or rainy day comes, then they transport the honey they (in their hurry) threw in the warehouses or kitchen, into the most inaccessible principal rooms, and barrel and seal it up secure, where it will keep safe for their use a long time; and in the night they build combs, and gnaw all projecting straws from the inside of their hive, filling the magazines with honey, or sealing the cells and young up, killing the Drones, &c.

A Bee-hive is a commonwealth, of which every individual is a senator, a soldier, and a mechanic. She is governed by laws which every one approves of, and yields cheerful obedience to; no

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parliamen-

* The History of Bees, p. 23.

parliamentary discords among them, no intestine wars, no arbitrary demands, no extorted obedience. She is a nation that holds no correspondence, nor carries on any traffic, with any other. Every individual in the hive studies the common good; they know not what it is to have poor among them; for they keep a common table, well furnished with wholesome food, the fruit of their own industry, to which all have alike free access, when need requires. They are temperate in diet, no gormandizers or drunkards among them (the Drones excepted); decent in apparel, wearing always home-spun gowns, and those always neat and clean. Every one of them is in the top of the fashion, both as to colour of apparel, and mode: they are not like the gaudy butterflies; neither do they employ dyesters to colour their clothes; perhaps they think that a diversity of colours would make them unfashionable, and at the same time make their clothes neither wear longer, nor shelter them better. The more rich they are, the keener they are on riches; and the more numerous, the keener on increasing their numbers. But in case their hives turn so full of Bees and honey, that they cannot get more room to stow honey in, then rather than be idle, they will rear up a young Queen, and send off a colony with her, and so constitute another hive; but after this, the mother-hive and her daughters will be as bitter enemies to each other, as if they had never seen other. They will receive none to their dominions to join with them, unless they come in an humble supplicating manner, proclaiming a truce of peace, as they surround

round and enter their gates; and also come without a Queen: sometimes they will receive them then as fellow-labourers and brethren, and ever after love and cherish each other. They are true to their word, for if once they pass it as friends, they never break it again.

Bees have a quick and an extensive smell; by it they will find out any honey, if within their reach, or flowers, though at a great distance. Some have thought it is by their smell they light on a flower, and know a stranger Bee. Others have said that bad smells are very disagreeable to them, and that they should not be placed near them, else they will not thrive. I never saw much evil done by bad smells, unless in their hives; they will work among stinking gutters, and places where urine is shed, and use pitch and tar. If one be stung by a Bee, the rest immediately smell the poison, and come enraged, and fly and pursue the wounded, and give him some more of the same, if his feet be not swift enough to carry him off from their territories.

They are very quick of hearing, for you can scarcely give their hive the smallest touch, but they will sound again all over their hive. And when a Bee, having lost its way home, with some difficulty has gained its door again, it will make a humming noise for joy; and if any other be seeking the way about the entry, its humming will call it home. Of all their senses their sight seemeth the weakest, says *Bufler*, and weaker when they come home loaded, than when they are empty; and when loaded, their sight is weaker when on foot, than when flying.

If when they come home loaded, they alight beside the door, they will go up and down seeking for it, as if they were in the dark; and unless they hit upon it by chance, they must fly again before they can find it. As many as fall beside the stool when it waxeth dark, ten to one they lie abroad all night: on this account it is that before they fly abroad, they take such pains at the door, in rubbing and wiping their glazen eyes, that they may the better discern their way forth and back again.

Bees are not all alike as to their nature; some are of a gentle and mild disposition, so as any thing may be done with them. I once took off six swarms of six different hives in one forenoon, and did not receive above two stings in all. *Columela* informs us, that the ancients distinguished several kinds of them: he joins in opinion with *Virgil*, who approves of those which are small, oblong, smooth, bright, and shining, of a gentle and mild disposition; "for," continues he, "by how much the larger and rounder the Bee is, by so much the worse it is;" but if it be fierce and cruel, it is the worst of all. The angry disposition of Bees of a better character is easily softened by the frequent intercourse of those who take care of them, for they grow more tame when they are often handled.

The time of the day, and state of the atmosphere, has a great influence on the temper of the Bees. The same Bees will be angry and hostile in the morning before they work any, and pacific in the height of the day, and angry at night again. Bees which are of the mildest kind

kind (for there is a great difference) are commonly the best, and should be always chosen, if a choice can be obtained. They are easily known, for by turning up a hive, if they are of the mild kind, there will few or none of them come running down to the under edges of the combs, but give a little buz with their wings, and never mind you much; as they mean no hurt, they dread none. But those of the angry kind, as soon as you turn up the hive, will come running to the extremity of the combs, and fly fiercely about your face and head, and vent their spite at you.

The state of the hive also sours or sweetens their tempers: the fewer Bees in a hive, the fiercer they are; and those that want a Queen are very churlish. The more Bees in a hive, if they have proper room to work, the better; and 16000 Bees in one hive, will gather far more honey, than if they were divided into two different hives, with 8000 in each; for as the proverb is, many hands make light work.

The fewer hives of Bees in one place, they will thrive the better; not so much because they will get more food, but because there will be fewer robbing Bees to disturb them. However a good hive of Bees scarcely suffers any by robbers.

If a hive of Bees in spring be well stored with honey, and but very few Bees, and robbers attack her, and she be presently removed, a mile or so, from any other Bees, she will soon recover and thrive well; whereas if she stand among other Bees, they will soon kill all her Bees, and take off her honey.

Feeding

Feeding Bees is madness, and should never be done, in harvest or winter: to set aside weak hives in harvest, is next to throwing money away; with this difference, that throwing money away, is only attended with the loss of it, whereas weak hives are lost in winter or spring, after a deal of trouble and care about them.

Weak hives die of cold, famine, and by robbers; and if one of a dozen come through with great care and trouble, they seldom turn out to any account next year.

Good stalls set aside in *September*, bid fair for a great deal of profit and pleasure next year, and little toil; but in swarming time, fine warm weather is best for Bees, with soft showers now and then: when there is a good crop of corn, it generally is a good year for Bees.

Bees will fly a mile or two for food, and sometimes farther; for I have seen Bees working on clover, and heath, and runches many times, and not a Bee-hive within four miles of them; but the nearer the better, for set a strong hive in the midst of a white-clover field, she will fill herself full in a few days, if the weather is good.

Early places is best for Bees, for they breed the sooner, and fill their hives, and swarms soon, and commonly work as long as later situations: for the weather generally turns cloudy in *August*; so they all give over work much about the same time. The chief breeding months is *April, May, June, and July*: the honey harvest is little more than *June and July*. Sometimes they will make honey in *May and August*, if the flowers be throng, and the weather fine.

Bees

Bees when they begin to build, lay the foundations of their combs at the top of their hive, and work downward.

I just this very day, being the 10th of *November*, have been seeing one of my hives carry yellow loads; and I turned her up, and had the pleasure to see more than three hundred cells sealed up, and young Bees in every one of them; hatching very finely, as if it had been the month of *April*. As she had plenty Bees, and I had one hive had not so many by the half, I took her off her stance, and set the one that had few Bees on it, and turned up the strong one, and gave her several raps on her sides, and took a weed and brushed the Bees off the combs, and they flew thick to their old stance, and run roaring into the weak hive, and she received them in a friendly manner. I set down the strong one, in the weak one's place, and shut her close up round and round, admitting very little air, to keep her warm for ten days, to hatch out her young the better; for I have oft seen maggots go backward in their cells, in cold weather, although never mentioned by any writer, nor any common Bee-master that ever I saw. Both the above hives are the better by what I have done to them, the weak one I am sure would have died of cold, having very few Bees, and the other breeding so fast, might probably have died of famine, if they had been in the hands of many Bee-masters; whereas now they are both safe from cold and famine.

I did the same with other two hives a week ago, and not one of them made any fighting. I very often reinforce weak hives in this manner,
both

both in summer and winter. The method of doing it is simple, and easy; not one of twenty will fight much. Many hives I did that way last year, and though I had thirty stalls last winter, I had not one dead; for whenever any one turned few in Bees, I reinforced her: and though it is thought by many, when I say that it is their own blame, that their Bees die, that I arrogate too much to myself, when I say I let none of mine die; it is not such a miraculous work as they think: all I do, is when a hive turns few of Bees, and thereby is likely to die of cold, or by robbers, I give her a good number of Bees, and then she is as stout as the best of them, and they who dare touch her will find themselves quite mistaken.

In case a hive lose her Queen, which but rarely happens, I put either another Queen to her, or a royal cell, or some new laid egg, which of them I can get best at; if a Queen can be got, I put her to the hive first, the royal cell next, and an egg is the last shift: then if a hive is like to suffer by famine, I blame myself for that, for being so foolish as to have kept one that had not enough of food to bring her to *June*. However I am obliged to make the best of an ill bargain I can, and give her honey-comb plenty, which baffles famine.

What a pity it is to see thousands of hives die in *Britain* every year by cold, famine, and robbers; and many by mice! when by a little attention, not one in thirty need be suffered to die: whereas I believe the fourth part dies yearly, one year with another, from the above causes.

Some

Some tell me, I may as well say I can preserve my own life, or the life of a beast, as say I can preserve a hive from dying! The case is no way parallel—a beast has only one life, and when it is out, it can by no means be put in again. But when the one half of the Bees in a hive dies, the other half is alive still; and add another half of Bees to them, they will be as vigorous and as young as ever: whereas let them alone with only their one half of the Bees the cold or age has left, then they are not able to preserve themselves from another cold storm, or a flight of robbers, but fall before them.

C H A P. VI.

THE HISTORY OF THE QUEEN BEE.

THE Bee called the Queen, so far as ever I could observe, has no sovereignty over the rest of the Bees. The form of government in a hive seems not to be monarchical, but a democracy; nor am I singular in this opinion; for both Monsieur *Reamur* and Mr. *Keys* are of the same mind. As a proof of what I assert, I have oft seen, when Bees swarm, the greatest part of them out of the hive, and lighted on a bush, before the Queen had left it; and when she did, she went directly to them. And if you spread a swarm on a sheet, and place an empty hive at any corner, the nearest Bees, whether commons or Queen, run directly to it, and

and all the rest follow. It is true indeed the common Bee will not settle in an empty hive without the Queen; neither will the Queen without the commons. The argument used by Mr. *Thorly* of there being but one Queen permitted to live in a hive, which he thinks amounts to a demonstration of their government being monarchical, has no weight with me; because one mother is capable to lay eggs enough to keep the hive full of Bees, and there is no need for any more. He advances also in support of his opinion, that the commons of a hive express great joy at the restoration of a Queen, after having lost one: but it appears to me, their joy arises from their receiving a mother capable of perpetuating their species in the hive, and so keeping it from coming to ruin; which would infallibly soon happen, unless she had been restored, or an egg to breed one, which is the same thing: but a hive could not subsist long without a mother, suppose she had a magistrate. He says *, "Without a president or ruler, they will do no manner of work, neither gather wax nor honey, nor other materials." I answer, a hive of Bees will work regularly, if they have even a new laid egg in the hive, to breed a Queen of; which must be twenty days before she come out of the cell; I ask who rules and governs them those twenty days? However as it would be of little consequence to alter her name; we shall still give her the appellation of Queen Bee.

The

The Queen is easily distinguished from the other Bees by the form and colour of her body; she is longer and larger than they are, and her wings are much shorter than theirs in proportion to her body; for the wings of both commons and Drones cover their whole bodies, whereas those of the Queen scarce reach beyond her middle, ending about the third ring of her belly: her hinder part is by far more taper than those of other Bees: her belly and legs are yellower than the common Bees: and her upper parts are of a much darker colour than theirs. She also has a sting, contrary to the opinion of some writers, who may have been induced to think she has none, because she is extremely pacific: one may handle and teaze her as much as they please, yet she never draws her spear for vengeance; nay, I never could provoke her to do it, nor could ever see her sting, but when I pressed her. The wise Orderer of nature disposes her to be of a peaceable temper; for were she hostile in her disposition, and drew her sting on every affront, and left it in her antagonist, it would be of dangerous consequence to the hive; as every Bee that leaves the sting dies soon after; I know not if they live two days. In her deportment she is solemn, and calm. A young Queen is a deal less than a full grown one, being not much longer than a common Bee, and is not so easily observed when sought for. When three or four days old, she is very quick in her motions, and runs very fast; but when she is pregnant with eggs, she is very large, her body is heavy, and when travelling, she drags
D along

along in a very slow manner, and is not so very fit for flying. It is necessary every Bee-master should know the Queen, as sometimes it may be of great advantage to him: the readiest way to know her is to get a sight of her from some acquaintance, if it can be obtained; or search for her among some small swarms of Bees by the above description.

It has been disputed by many authors whether the Queen bees are males or females. The ancients, with some of the moderns, are positive that they are males, alledging that government is most natural by the males; and that the seed cast into the cell by them is sperm, and not an egg. The bulk of the moderns maintain, with weightier reasons on their side, that they are females.

The matter cast into the cells by the Queen appears (say they) to be an egg, and not sperm, from these reasons, viz. its being always of the same size and colour, and covered with a thin membrane; whereas it cannot be affirmed that the sperm of man or beast is always of the same quantity, and covered with a membrane.

We shall now consider the Queen as to the manner of her birth, and from what she proceeds: and in the first place, she proceeds from an egg, as do all the other Bees; but writers differ as to what kind of egg it is. Almost all agree in this, that the Queen lays a particular kind of eggs appropriated to the production of other Queens; and that without a royal egg be laid in a royal cell before the departure of the old Queen, (suppose there should be never so many common eggs) the hive would never have

have a Queen-breed, and consequently come to ruin. The author of the Natural History of Bees says, 'I have drowned several hives, the swarms in which could not be forced out by any means, and after examining all the Bees attentively, I ever found that there was but one single mother, and that this was the old one; the eggs or maggots of the young Queen-bees having, I suppose, been destroyed by some accident*.' Mr. Keys on that head says, 'that the gentleman might have taken a common egg, and placed it in a royal cell, and that a young Queen had been afterwards produced, I will not dispute; for there might be a Queen already in the hive unperceived by him, which might lay a royal egg in that cell, the working Bees having first taken away the common eggs. Let this be as it will, in practice it can be of no consequence or use, as he acknowledged that a common egg must be deposited in a royal cell. To do this the Bees must be drove, and some combs cut out; in the performance of which a real royal egg may be destroyed, and the rest of the young injured: the operation itself is likewise troublesome†.'

(As a particular knowledge of the Queen is very necessary in order to a right management of Bees, I hope the reader will excuse my prolixity on this subject.)

I shall quote Mr. *Debraw's* doctrine on this head, as mentioned in the Universal Dictionary, when explaining the word Bee; he having

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found.

* Page 323.

† Page 120.

found two Queens in a glass twenty days after a small swarm was put in it. He says, ' I conjectured that either two Queens, instead of one, must have been left among the Bees I had placed under that glass; or else that the Bees could, by some particular means of their own, transform a common subject into a Queen. In order to put this to the test, I repeated the experiment with some variation. I got four glass hives blown flat, which I thought preferable to the bell-shaped ones I had used before, as I could with those better examine what was going forward. I took a large brood-comb from an old hive, and after having divided it into several pieces, I put some of them, containing eggs, worms, and nymphs, with food, viz. honey, &c. under each of the glasses; and confined within each a sufficient number of common Bees, among which I left some Drones, but took care that there should be no Queen. The Bees finding themselves without a Queen, made a strange buzzing noise, which lasted near two days; at the end of which they settled, and betook themselves to work: on the fourth day I perceived in each hive the beginning of a royal cell, a certain indication that one of the inclosed worms would soon be converted into a Queen. The construction of the royal cell being nearly accomplished, I ventured to leave an opening for the Bees to get out at; and found that they returned as regularly as they do in common hives, and shewed no inclination to desert their habitation. But, to be brief, at the end of twenty days, I observed four young Queens

Queen's among the new progeny. On relating the result of these experiments to a member of this university, well conversant in the natural history of Bees, he deemed it necessary, that they should be repeated, in order the better to establish the truth of a fact seemingly so improbable, that the eggs destined by nature to produce neutral or common Bees, should be transformed into females or Queens. He started an objection, that the Queen Bee of a hive, besides the eggs she deposits in the royal cells, might also have laid royal or female eggs either in the common cells, or indiscriminately throughout the different parts of the hive. He further supposed, that in the pieces of brood-comb, which had been successfully employed in the last experiments for the production of a Queen, it had constantly happened that one or more of these royal eggs, or rather the worms proceeding from them, had been contained. But the force of his objection was removed soon after by the same success having attended a number of other experiments, an account of which would take up too much room here; and he was at last brought to admit, that the working Bees are invested with a power of raising a common subject to the throne, when the community stands in need of a Queen; and that accordingly every worm of the hive is capable, under certain circumstances, of becoming the mother of a generation: that it owes its metamorphosis into a Queen, partly to the extraordinary size of the cell, and its particular position in it; but principally to a certain nourish-

'ment appropriated to the occasion, and care-
 'fully administered to it by the working Bees
 'while it is in the worm state, by which, and
 'possibly other means as yet unknown, the de-
 'velopement and expansion of the germ of the
 'female organs, previously existing in the em-
 'bryos, is effected; and those differences in its
 'form of size are produced, which afterwards
 'so remarkably distinguish the Queen from the
 'common working Bees. And finally, it ap-
 'pears evident, from the experiments made by
 'Mr. *Schirach* and myself, that the received opi-
 'nion, the Queen lays a particular kind of eggs
 'appropriated to the production of other Queens,
 'is erroneous. I shall now beg leave to point
 'out the advantage that may accrue to the pub-
 'lic from these observations, which is that of
 'forming artificial swarms or new colonies; or
 'in other words, of furnishing the means to
 'bring on a numerous increase of those useful
 'insects: an object of some importance to this
 'kingdom, as being the only means to prevent
 'the annual exportation of considerable sums
 'the purchase of wax, a great quantity of which
 'is lost every season for want of keeping up
 'sufficient stock of Bees to collect it.'

'The practice of this new art, Mr. *Schirach*
 'tells us, has already extended itself through
 'Upper Lusatia, the Palatinate, Bohemia, Bavaria
 'Silesia, and even in Poland: in some of these
 'countries it has excited the attention and pa-
 'tronage of government, and even the Emper-
 'or of Russia has thought it of such importance
 'that she has sent a person to Kleen-Botzen to

' be

‘ be instructed in the general principles, and
‘ learn all the *minutiae* of this new art.’

Long before I had the account of Mr. *De-
braw*’s experiments, I had often taken off swarms,
and left no Queens nor royal cells in the mother
hive, and yet they would breed young Queens,
which surprised me much, how they had got
them, as the received opinion was, they could
not breed one if the old Queen was taken away
before the hive had a royal cell: after seeing
his sentiments on that head, I thought it told
very well; and resolving to be certain as to that
point, I made many experiments of my own in
swarming time, and they all succeeded to my
wishes: but in order to put it beyond all dis-
pute, I shall relate one experiment I made with
a hive this spring, full two months before the
usual swarming time. I had a hive that was be-
ginning to carry well and breed fast, but was
not half full of Bees, and had only one Queen,
but neither Drone nor royal cell; neither of
which could be expected at that time of the
year, being about the middle of *April*: I took
out her Queen and the most part of her Bees,
and left the old hive with only some common
Bees, to provide themselves with a Queen, and
hatch out the brood in the cells; they did not
disappoint me, for as soon as the melancholy
news were known in the hive, that their loving
mother was torn from them, they mourned for
their great loss for the space of two hours; but
a general

* Mr. *John Debraw*’s Phil. Transf. Vol. LXVII.
Page 15, &c.

a general council being called, the most experienced sages among them reasoned to this purpose: 'Whereas our mother, and many of our brethren, have been most cruelly and unexpectedly torn from us in such an unnatural way, as has neither left us a young mother, or a pregnant mother cell, as we have commonly when we send off a colony by our own deliberate counsel; had a few of our beloved brethren been only taken from us, the loss would have been but trifling, as our mother being among us, could soon have repaired our loss again; but our beloved mother being gone, never to return, and as at present we have no pregnant mother cell, if we continue a very few days in this mournful inactive case, all our eggs will soon turn common Bees, after which, by no power of ours we can ever expect a mother again, and all we who are past the flower of our days will soon die of age, and those of our beloved brethren will become a prey to cruel invaders, or being few in number, will die a lingering death by cold.—But though our case be bad, it is not desperate, as we have among us new laid eggs, which, we all know, by building a mother cell about, and adding proper nourishment, we can raise a mother Bee again. Let us fall heartily to work, and build mother cells about one of those eggs which you see at the edge of that comb, in the middle of our hive, which will be warmest.'

Whether the counsel was given in the same words, or whether some addition or diminution might be made, I will not positively say: in general it appeared to be taken by the whole common-

commonwealth; for at the end of two hours after the Queen's capture, the Bees fell briskly to work, and wrought smartly for two days, (as their manner is in such a case) some forming the royal cell, and some putting a large quantity of whitish and thick liquid stuff into it, not unlike cream; and at the end of three days their royal cell was fairly formed; and the rest of the Bees sealed up the common Bees' cells, and all were throng at work †. On the fifth day I saw the royal cell well enlarged, and a great deal of the aforesaid white stuff in it, almost as much as a woman's thimble would hold; and a white maggot lying on the top of it. On the seventh day the Bees sealed it up *: on the seventeenth day there came forth out of the royal cell a young Queen †, and on the twenty-fourth day the young Queen laid eggs again, and on the thirty-first day they were sealed up, and on the forty-third day there came out of the

† Instead of idleness, confusion, and sorrow, (as mentioned by *Thorley* and *Keys* in such a case) consideration and reformation take place, with the greatest assiduity and labour to put all to rights again. Another proof that they can advise about public matters without a Queen to preside.

* *Mr. Keys*, who is a keen advocate for royal eggs, (p. 12.) will in his next edition inform us where the Bees got this royal egg, when there was nothing but common eggs in the hive when the Queen left it.

† *Mr. Daniel Wildman*, nephew to *Thomas Wildman*, is widely mistaken, when he affirms that a royal Bee is five or six weeks in hatching.

the cell a new set of young again §. At the same time, the middle of *April*, I did the same with other two hives, and they both succeeded the same way. I shall just mention shortly one further experiment:—I took the Queen and the most part of the Bees out of a hive which had no royal cell nor drone in her; and in nineteen days she had a Queen, and the twenty-fifth day she laid eggs; and then I took the young Queen out again, and left the old hive with some new laid eggs in her; and eight days after she had a sealed up royal cell again, which I directly took out

§ I shall insert a paragraph of Mr. *Keys*, wherein he shews his ignorance respecting both the Queen and Drones. Paragraph 12, he says, “But this surprise will be greatly heightened, by reflecting upon a fact, which is still more wonderful, *viz.* that of appearing to be endowed with a power of keeping in her body eggs that have been impregnated several months before; or (which amounts to the same) the seed of the male, capable of vivifying the eggs at the time of their exclusion: for though the Drones, who are the males, are seldom suffered to remain in the hive longer than the middle of *August*, yet the Queen still continues to lay eggs, and produce young, not only in autumn, but also in the next spring, until *March* and *April*, in great abundance, all by virtue of the autumnal impregnation.” Mr. *Keys* says, “It is surprising and wonderful:” so it would be, were it true: but as he is so fond of wondering, I suppose by this time I have given him something to wonder at; and that is how my young Queen was impregnated by the males (as he calls them), seeing they were all dead seven months before she was bred, and she never saw any till six weeks after, and those were produced from her own eggs.

out of the hive again, and then she had neither Queen nor eggs, but I took a piece of comb with eggs in it out of another hive, and fixed in her again, and she immediately built another royal cell.

Some drone-pleaders may perhaps say, that suppose there were no drones in the hive when I took their Queen from it, that there might be eggs laid in drone cells, which would come forward to be drones as soon as the young Queen, and so impregnate her, and make her fit for breeding; but the contrary is the fact, for when the old Queen was taken out of the hive, there was not an egg in one drone cell: if there had been any such thing, I would have seen the Bees sitting upon the drone cells or comb, which they did not, as they did on the common Bees' cells, and the royal cell: besides I turned the hive up every two days, during the whole forty-three days, in order to see how long they were in building the royal cell, and sealing it up, and how many days it was before an egg became a Queen, and how old she was before she laid eggs, and how long they were before they became common Bees; besides I wanted to be assured whether a Queen needed the agency of the drones in order to become a mother, and I often turned the Bees over and over in the hive, with a small stick, searching for drone cells, and drones, but no such thing was to be seen till six weeks after this young Queen's birth, when she laid eggs in drone cells, and then the hive had drones; and as the above experiment was repeated again and again, it makes an entire evidence and a certain proof (and I affirm).

affirm) that the common Bees can raise any egg in the hive to be a Queen, when the community stands in need of one. The way they do is this, they make choice of a common cell with an egg in it, and put in some white stuff (with their mouths) of a thickish substance *, and be-
gin

* Mr. *Thorley*, page 96, says, "That it is really peculiar, and very different from that gross matter which is employed in nourishing the other young. I cannot but conclude, from what I have found and taken out of the royal cell, of a very different kind and quality, being of a gummy glutinous nature, of a deep red transparent, and would rather dissolve and melt in the fire, than crumble to powder." I also have dissected a royal cell that had proved abortive, after the Queen had received something like her form, but had gone back again, (for what reason I am not certain) and found that red matter in them (mentioned by *Thorley*) not unlike sugar-candy, as large as a pea, but of a hard tough substance, which would not break, but tear asunder, and no way tasted like honey. I have conjectured that perhaps this red matter, contained in those royal cells, which always proved abortive, might not be proper nourishment for the young Queen, and the Bees had not taken their usual way in placing it there; for though in general they work uniformly, yet not always; for example, take out a common brood-comb, and look in it, and you will plainly see common young maggots in the form of a semicircle, some with their middles uppermost, others with their middles undermost, and some with their extreme parts undermost, and others uppermost, and scarcely two lying in the same position: and look into a hive and you will see the combs built parallel from the entry, other some of a semicircular form: again some hives build their royal cells indiscriminately in the hive, some in the middle of a comb,

gins to build upon the edges of the cell, and enlarges it; so that on the third day it appears fairly on the outside of the comb in the form of (and may now be properly called) a royal cell. On the fifth day, the cell being well enlarged, and a great deal of the said stuff in it, the royal maggot appears in the form of a semicircle, great at the middle and small at every end, not unlike a new moon, swimming on the top and in the midst of the said stuff in the cell; and on the seventh day it is sealed up.

During this time it undergoes various changes; for a day after it is sealed up, being the eighth day, I have opened the cell, and found the maggot on the top of the white matter, (so often mentioned) and have taken it in my hand, and shewn it to some of my acquaintance, and it would have moved a little time, although no more like a Bee, than a turnip, being a gross white maggot. On the seventeenth or eighteenth day comes forth a pretty Queen Bee. Also I affirm from the aforesaid experiments, that the Queen Bee is capable of becoming a mother without so much as seeing a drone; and that the doctrine of all those (almost every

E

writer)

comb, others on the sides, ends, edges, &c. and in some hives the drone-combs are in the middle, others at the edges of the hives; some hives have only half a drone-comb, others a whole one, and other some two. However as a conjecture I pass it; but this I affirm, that every royal cell which brings forward a Queen, (and not one in twenty misses) is filled with the very same kind of white and thick matter, resembling thick cream, as aforesaid.

writer) that affirm the Queen cannot breed without the agency of the drones or males, as they call them, is a mere fancy sprung up in their over-heated brain.

As to the use and employment of the Queen; in the first place, she is the alone mother in the hive, and a hive would soon come to ruin without her; like a nation that were all the females killed or banished out of it, although there were thousands of legions of men in it, every one knows it would soon be without inhabitants; the case with respect to a nation of Bees is exactly parallel, for if one had a hive full of Bees without a Queen, or an egg to breed one of, a few months would put a period to all their lives. The Queen is capable of laying eggs five or six days after her birth, and lays only one kind of eggs, and not different kinds, as writers have conjectured; and I own that the sound of one kind of eggs being raised either to be a Queen, or common, or drone, as the Bees think fit, is not so easily heard by some ears: but wherein does it sound softer, in asserting that the Queen can lay three different kinds of eggs. I do not pretend to account for it in a philosophical manner, but I shall only offer my humble opinion on that subject.

First, it is plain to every one that ever saw a Queen Bee's eggs, that as they come from her, they are the identical bigness and colour, and covered with the same membrane, although laid in different cells, as in common, drone, or royal cells; and that the change that takes place among them, may rationally proceed from these two causes, viz. the difference of the cells, and

different

different kind of nourishment put in by the Bees: and the eggs as deposited by the Queen, in whatever cell, is neither Queen, common, nor drone, if I may be allowed the expression; but if the common Bees think proper, when they find an egg in a common cell, they put in such nutritive matter as they know will make it a common Bee; or if they want it to be a Queen, they enlarge the cell, and put in such nutritive matter as they know will nourish it up to be a Queen; or if they find an egg in a drone cell, they put in such matter as will nourish it forward to be a drone: and so it would seem that nutritive matter, together with the kind of cell, is the thing that determines the kind of Bee; after which, adding a proper heat, it appears in due time such a Bee as they intended it to be; and in this case they have a power above any creature I know, and that is to make their eggs into any kind of Bees they please; their eggs differ widely from the eggs of any fowl I know of, because the kind of creature it is to be, is contained in the egg as soon as laid, and it needs no nutritive matter to nourish it, nor could it absorb into the egg; all that it needs is a due heat to nourish it forward.

That the working Bees, and none other, put in that matter, clearly appears from the before-mentioned experiment, *viz.* that when there are new laid eggs in a hive, and neither Queen nor drone in it, yet the common Bees can nourish up those eggs to be either Queens, commons, or drones, as they see fit. What kind of matter this is is not so easily known; whether of a generative nature, or a kind of food, is the query:

if we say this matter is of a generative nature, then it must be sperm, and those that put it in must be males, and that those males must have three different kinds of sperm in them, viz. one kind to make eggs common Bees, and another kind to make eggs Queens, and a third to make eggs drones; and that at all times every Bee has those three different kinds of sperm at command to throw into any cell he pleases, which is contrary to the received opinion, which is, that the male of mankind and beast have only one kind of sperm, and not always power to eject it; besides it is put into the cell by the mouth of the Bee, and no sperm comes from that part.

There has been much dispute among writers on this point. *Thorley* says, it is that stuff which the Bees carry on their legs, mixed with water by the Bees: it does not appear to me, seeing it has neither the taste nor colour of that stuff. He says, that it is confessed by all hands, that the Bees do not breed till the flowers furnish them with proper food for the young foetus, and they are seen to transport this matter daily to their hives. I must differ from him and all hands that confess that, for I have often seen the contrary: for instance, last *December* I had a hive which had new laid eggs in her, and cells new sealed up, in great numbers, and hatched them out young Bees; and it is no new thing, for I have seen the like in the middle of winter, and time of a storm, a dozen years ago; and I have seen some of my hives that I feed in winter build new combs, and breed young in them, and yet had carried in neither the said stuff nor water, as there were no flowers for them to work

on,

History of the Queen Bee.

on, and had they gone for water, they behoved to light on ice, and they would seen how they got off it again. If the stuff they carry on their legs be useful for feeding young Bees in the cells, then those bred in winter must be nourished with that in the hive, which they gathered in summer.

Mr. *Debraw* says *, ‘It is a whitish liquor put in by the posterior parts of the males, or little ‘drones’ (as he calls them). That there is a whitish liquor put in the cell I grant; but that it is put in by stingless Bees, or little drones, I flatly deny; as also the assertion that there are such things in being as little drones, or two different kinds of them; as shall be fully demonstrated when treating of the drones separately.

The Queen, as granted by all, (*D. Wildman* excepted†) lays all the eggs in the hive, as may be proven by the following evidences:

I. Hun-

* *Universal Dictionary, Word Bee.*

† *D. Wildman* maintains a very wild whim, one of his own framing; he has the honour to be the first venter of it, and it will certainly continue his own. He asserts, as quoted by Mr. *Keys*, section 17. that “the opinion of the Queen being the general parent of the whole stock is absolutely without foundation. He further says, that the common Bees couple together I make no doubt, though privately, and apart by themselves: though they never were observed, (I add, never will) yet they certainly apply themselves to that business secretly, (within the hive, or else abroad where there can be no witness).”

- I. Hundreds have seen her lay eggs in common and drone cells.
- II. None ever saw common Bees or drones lay eggs.
- III. Take a Queen out of a hive, and ten days after take out all her royal cells, and she will never have another egg in her.
- IV. If a hive want a Queen one month, she will never have an egg more in her, though she have never so many common Bees; but by giving her a Queen again, she will directly lay eggs, and the hive breed again. She lays eggs without the agency of the drones.

She is very prolific. *Swammerdam* beheld in the ovarium of a Queen-bee 5100 eggs at one time; and *Reaumur* says, that in 24 hours she lays 200 eggs, and that in the space of three weeks 6000 Bees are brought to perfection. Neither need this be thought incredible, if we consider that some cod-fish have had to the number of 9,344,000 eggs in them *. Her prolific-
ness

"neffes)." This hasty begot child will have few to patronize it; if its father does not strangle it soon, it will die of its own accord: Mr. *Keys* has lent it some lusty blows already, and wherever it comes it is sure to meet with the like treatment: its safest course is to stay with its father, unless it wants its own ruin, and his folly exposed.

* Nat. Delin. p. 130.

ness seems to depend on the state of the hive she is in; and I have been apt to think that the increase of a hive scarce ever fails on the Queen's part; for in the four breeding months, *April, May, June, and July*, if the weather is good, all Queens breed surprisingly fast, if they have plenty of common Bees to nourish their eggs forward; and if you have a hive that by reason of few Bees does not breed fast, if you add a large quantity of common Bees to her, she will increase as fast as any: yet it cannot but be allowed that there must be some more fruitful than others; though it is seldom a hive suffers by that cause. It is quite a mistake, as has been already noticed, that bees breed only at such times as they carry flowers to feed the young with; for many hives breed in the midst of winter; yet it must be granted that they breed far faster in times when they carry.

If Bees had not a power of raising an egg to be a Queen when they stood in need of one, how precarious would a hive of Bees be, if we consider how tender an insect a Queen Bee is, and how many accidents may befall her! If she should, when out taking the air, meet with any misfortune, such as being trod under foot, or devoured by Bee-eaters (of which there are many), or chilled with cold, or by lighting at another hive, or by any other accident, then the hive would be directly ruined.

Again, if we consider the large quantity of Bees in a hive at harvest, (sometimes 12000) and that hive reduced to 500 in *March* by cold, old age, &c. and yet the Queen then healthy: in such a case, there is 24 dead for one living.

How

How ready would we be to wonder how the Queen had been preserved! And many times I have seen a hive in spring, and not 100 Bees in her besides the Queen: and once I saw a hive with a Queen and only two Bees in her; and I scarcely ever see a hive want a Queen, if she gets fair play: the reason which appears to me why they are preserved so well is, because they are always in the safest part of the hive, being in the very midst of the Bees, so that the cold, robbers, or any other enemy cannot get at them till all the other Bees be destroyed.

But it appears to me that the principal reason of their preservation and continuation is, that the hive is seldom without eggs in her throughout the whole year, though generally they want them in *November* and *December*, yet not always. And as they have almost always eggs by them, if the Queen dies, then they can repair their loss in twenty-five days; for an egg can be raised to be a Queen to lay eggs in twenty-five days.

From what has been said it may be easily seen how a hive comes to want a Queen so seldom. And the reason why she ever wants one at all is, when a Queen dies, and there is no royal cell nor new-laid egg to make one of; then the ruin of that hive is inevitable, unless the owner lends his helping hand. I have thought that if the Queen should fall sickly, and no eggs in the hive, then the Bees must be in a very melancholy case, as there is nothing between them and ruin but the life of a very sickly Queen; and if she dies in such a critical juncture, when they have no eggs, then their hope is lost. I suppose that is the case with

those

those hives which are deserted by their Bees in winter, and yet have a deal of honey left in them; for it is a very rare case for Bees to desert a hive when they have a Queen. Sometimes indeed I have had Bees desert their hives in spring, when their honey was done, although they had young in their cells; but I never knew them to do that but one spring, when I had five hives that did it, and I often wondered how it happened, as they use commonly to die of famine when their honey is done.

The Queens are bred generally in swarming-time, as may be seen by turning up a hive at that time: there the royal cells present themselves to view upon the edges or sides of the combs; they are of an oblong and circular form when half made, not unlike the lower part of an acorn turned upside down; and when sealed up and finished, near an inch long, and not unlike one's little finger end, if it wanted the nail, to look at. In swarming-time there will sometimes be from one to six of these royal cells in a hive, though generally but two or three.

Many times in harvest, when top swarms are taken, there are royal cells seen in them, which Queens had been bred in since they were swarms; it is probable the old Queens had come off the mother hive along with those swarms, and had turned aged and infirm, and the young swarm had provided themselves with young ones, as long as they had eggs to make them of.

I can account no other way for the succession of Queens than this—when a Queen turns aged, the Bees consider that if they do not improve
their

their time, and raise one of her eggs to be her successor, as long as she lays them, that she may soon either turn barren or die, and what will become of them then? therefore they perhaps have some instinct, and know about the time their mother will die, and that it is now time for them to provide for themselves; but if the daughter happen to be born before the mother's death, I know not how they will do in that case, whether they will have any natural affection to their infirm mother, as knowing she will not trouble them long; or whether she will share the fate of the poor drones:—I fear the worst. The sixth *October* last, I saw at the entry of one of my top swarms a dead mother, all torn about the wings; I was jealous they had not given her fair play for her life: she was a last year's Queen, for I brought her off with the said swarm.

I think a Queen lives about fourteen or fifteen months; for three or four of my own artificial swarms, their Queens died about the middle of *September*, and they were old Queens when I swarmed them in *June*, I suppose they were a year old when I swarmed them, and the Queens that took up house with their mother hive in *June*, 1787: or in other words, in *June*, 1787, a new hatched Queen came off with a swarm naturally, and set up house with them; and in *June*, 1788, was taken out of her hive with a new swarm again, and continued in her, and laid eggs till *September*, 1788; at which time she being old and infirm, the Bees raised up one of her eggs to be a Queen, to succeed her; after which birth she was suffered to die

of

of age, or slain by her own children, as now useless, and not for any more public good.

When the Queen lays her eggs, she puts for a moment her head into the cell where she designs to lay them; if she finds the cell empty, and there is not in it either honey, egg, or any embryo; she turns herself immediately to introduce the posterior parts of her body into the same cell, and sinks into it, till she touches the bottom, and then lays her egg, which is very small, about half a line long or little longer, yet four times longer than it is big, a little more pointed at one extremity than the other, and planted by its least extremity on the basis, or the solid angle of the cell. This egg is formed of a membrane, thin, white, smooth, and full of a whitish liquor. After the pregnant Bee hath laid an egg in one cell, she immediately goes to another, and lays in it the same manner, and so on, and will sometimes lay a good many at a time. The egg continues three days in the state the Queen laid it, the fourth day the Bees put in with their mouth a small whitish liquor, of a clammy substance, which absorbs into the egg, and then it changes its form into that of a small worm, divided into several rings, laid on the same basis, and twisted round, so that the two extremities touch each other. On the fifth day it is advanced into a middling large size, so as to fill the whole breadth of the cell, and is thought to be fed on the fifth, sixth, and seventh days, at the mouth, with honey, by the Bees; during which time it has not the smallest resemblance of a Bee, having neither head, legs, nor wings. On the eighth

eighth day it is close sealed up in the cell, and receives neither food nor air, and undergoes various changes, till on the nineteenth day it comes out of the cell, a perfect Bee. It is disputed among the learned whether this insect dies at the time of its transformation or not. I will not take it upon me to decide in such an intricate matter, only I know it is alive in its worm state; and I never saw but when I opened a cell at any time, I always saw the inclosed nymph to make a slow movement.

The Queen sometimes in the middle of summer takes an airing, and that but very seldom; for though I have spent many hundred hours amusing myself to see them carry on their delightful labours, yet I never saw a Queen go an airing, but four or five times: it is well it is so, for were she a gadder abroad, it might endanger her life, to the great detriment of the hive. Whether ever she airs herself in a fine winter's day, (when the Bees are fond of it) or not, I cannot say, for I never saw her.

The Queen has a great deal of respect paid her by her children, and also by any other Bees that may have been added to the hive; for Bees will rather die, than leave their Queen; the reason is very good, for when with her, they may have some hope of her and them being put in a way to thrive again; but were they to leave her, they cannot but soon come to ruin.

Their love for their Queen doth not seem to rise from blood-relation, but from her usefulness among them: did their affection arise from relationship, they would never kill any of their
Queens,

Queens, when they have more than one in a hive. It further appears by the same regard being shewn to her, when swarms are united, by those Bees which are not her relations, as by those which are. Again, if you take a native Queen from a hive, and put a stranger to them, they will be very fond of her; and should you return their mother to them again, they would fall on her like as many lions. *Reaumur* says, they are not attached to the person, but to the dignity of the Queen, which is too commonly true with regard to men.

There is only one permitted to live in a hive during the year, unless it be in swarming-time; when new hatched they will allow them to remain till a fit season occurs for them to go off with a swarm: but they must improve their time when it offers, for if they be too long in going off, they will lose their lives for their indolence. I never saw two Queens hatched out of one royal cell, I mean one after another; the eggs always are laid in common cells, and when they want a Queen they build a royal cell around it, and thereby get a Queen. Last summer I wanted three Queens to put to three hives that wanted Queens: in order to get them, I took a Queen from a hive, and put to one of my Queenless hives: the hive that I took the Queen from, in eight days had five sealed up royal cells. I took two of the royal cells, and fixed in the other two Queenless hives, and they became Queens to them in due time. A royal cell I left in herself to supply her with a Queen, the other two I dissected in order to see the progress of the maggots in the cells. I have often

taken a Queen from a hive, and they would only build one royal cell, sometimes two, other times three, and in the above five cells, although she was a very weak hive of Bees, and had those five maggots in these cells turned all Queens, four of them would been killed, for they had not Bees to send off swarms with one of them.

C H A P. VII.

THE HISTORY OF THE DRONE BEE.

THE Drones are well known insects by every Bee-master that takes the smallest notice of Bees, and scarcely need to be described. They are both larger and longer than the common Bees; their head is round, their eyes full, and their tongue short. Their belly differs from the other two, being broader, and much more obtuse; and they are of a darker colour than the rest. They make a much greater noise when flying, than the Queen or common Bee, by which they may easily be distinguished.

As to their sex, ancient writers in general, philosophers, historians, poets, and physicians, together with several modern ones, viz. *Butler, Purchas, Warder, Bradley, Reaumur, Maraldi, Debraw, Keys*, and others, are strong advocates for the Drones being the male Bees. Some, as *Thorley*, seem to give arguments against

gainst it: and Mr. *Schirach*, and his friend Mr. *Hattorf*, annihilate entirely the use of the Drones, and advance this singular opinion, (says *Debraw*) that the Queen lays eggs which produce young Bees without any communication with the Drones. Singular as their opinion is, it appears to be the truth, as I shall shew from good arguments: That the hives are replenished with Drones at the season of the year, as granted by all, when no Drones are in being, nor have been so for eight months before, seems to be a sufficient argument to any rational creature, that the Drones are not the males.

- But the Drone advocates alledge, that the Drones fecundate the Queen before their brethren kill them; and by which she remains seven or eight months with perhaps 12000 impregnated eggs in her ovarium: certainly she would be large all that time. But it would be needless to spend time on that subject, seeing I have formerly shewn how I have many times had Queens breed and lay eggs, and those eggs become Bees; and yet that Queen was bred seven months after all the Drones were dead, and six weeks ere any were hatched; which I think is sufficient to silence all the large Drone advocates. But we have Mr. *Debraw* creating little Drones, and also giving them power to live all the year, and to impregnate the Queen at pleasure. I shall here give an account of his sentiments and experiments on that head, as inserted in the Universal Dictionary on the word *Bee*; where, when speaking of the little Drones, he says, 'They have notwithstanding escaped the observation of Mr. *Schirach*, and of his

friend Mr. *Hattorf*, member of an academy in *Lusatia*, who, in a memoir he presented in the year 1769, annihilates entirely the use of Drones in a hive; and advances this singular opinion, that the Queen-bee of a hive lays eggs, which produce young ones, without any communication with the Drones. For what purpose should wise Nature then have furnished the Drones with that large quantity of seminal liquor? To what use so large an apparatus of fecundating organs, so well described by *Reaumur* and *Maraldi*? But I beg leave to remark, that these gentlemen seem to have drawn too hasty conclusions from their experiments, in rejecting the Drones as bearing no share in the propagation of those insects. Their observations, that hives are peopled at a time of the year when no Drones are in being, are no ways conclusive; as it is evident, that they had seen none but Drones of a large size, their silence on the difference of the size of them justifying my remark. But to resume the narrative of my experiments: I had watched my glass-hives with indefatigable attention from the moment the Bees, among which I had taken care to leave a number of Drones, were put into them, to the time of the Queen's laying her eggs, which generally happens the fourth or fifth day. I observed the first or second day (always before the third) from the time the eggs are placed in the cells, that a great number of Bees, fastening themselves to one another, hung down in the form of a curtain from the top to the bottom of the hive, in a similar manner they had done before at the

time

‘ time the Queen deposited her eggs; an operation which (if we may conjecture at the instincts of insects) seems contrived to hide what is transacting: be that as it will, it answered the purpose of informing me that something was going forward. In fact, I presently after perceived several Bees, the size of which, through this thick veil, (if I may so express myself) I could not rightly distinguish, inserting the posterior part of their bodies each into a cell, and sinking into it, where they continued but a little while. After they had retired, I saw plainly with the naked eye a small quantity of a whitish liquor left in the angle of the basis of each cell, containing an egg; it was less liquid than honey, and had no sweet taste at all. Within a day after, I found this liquor absorbed into the embryo; which on the fourth day is converted into a small worm, to which the working Bees bring a little honey for nourishment during the first eight or ten days after its birth. After that time they cease to feed them; for they shut up the cells, where those embryos continue inclosed for ten days more, during which time they undergo various changes too tedious here to describe. To evince the reality of this observation, and to prove that the eggs are fecundated by the males, and that their presence is necessary at the time of breeding, I proceeded to the next experiments. They consisted in leaving in a hive the Queen with only the common Bees, without any Drones, to see whether the eggs she laid would be prolific. I accordingly took a swarm, shook all the Bees into a tub of wa-

ter, and left them in it till they were quite senseless, which gave me an opportunity to distinguish the Drones without any danger of being stung. After I had recovered the working Bees and their Queen from the state they were in, by spreading them on brown paper in the sun, I replaced them in a glass-hive, where they soon began to work as usual: the Queen laid eggs, which I little suspected to be impregnated, as I thought I had separated all the Drones or males; but at the end of twenty days (the usual time of their hatching) I found to my surprize some of the eggs hatched into Bees; others withered away, and several of them covered with honey. I immediately inferred that some of the males, having escaped my notice, had impregnated only part of the eggs; but, in order to convince myself of the truth of my supposition, I thought it necessary to take away all the brood-comb that was in the hive, in order to oblige the Bees to provide a fresh quantity, being fully determined to watch narrowly their motions after new eggs should be deposited in the cells. This was done accordingly, and at last the mystery was unravelled. On the second day, after the eggs were placed in the cells, I perceived the same operation which I have related in a former experiment; I mean the Bees hung down in the form of a curtain, while others thrust the posterior part of their body into the cell: I then introduced my hand into the hive, broke off a piece of the comb containing two of those insects, and kept them for examination, I found in neither of them any sting;

‘ sting ; (a circumstance peculiar to Drones only) and upon dissection, by the help of a *Dol-*
‘ *lond*’s microscope, discovered in them the four
‘ cylindrical bodies, which contain the glutinous
‘ liquor of a whitish colour, observed by *Maral-*
‘ *di* in the large Drones. Having till then ne-
‘ ver observed any difference in the size of
‘ Drones, I immediately perused the memoirs on
‘ Bees published by Messrs. *Maraldi* and *Réau-*
‘ *mur*, and found that they had remarked it fre-
‘ quently. The reason of that difference must,
‘ I doubt, be placed amongst other arcana of
‘ nature. I found myself therefore under a ne-
‘ cessity, in my next experiments, to be more
‘ particular in destroying the males, even those
‘ which might be suspected to be such. I once
‘ more immersed all the same Bees in water ;
‘ and, when they appeared to be in a senseless
‘ state, I gently pressed every one of them be-
‘ tween my fingers, in order to distinguish those
‘ armed with stings from those that had none,
‘ which last I might suspect to be males. Of
‘ these I found fifty-seven, exactly of the size of
‘ common Bees, yielding a little whitish liquor
‘ on being pressed between the fingers. I killed
‘ every one, and replaced the swarm in a glass-
‘ hive, where they immediately applied again to
‘ the work of making cells ; and on the fourth
‘ or fifth day, very early in the morning, I had
‘ the pleasure to see the Queen-bee depositing
‘ her eggs in those cells, which she did by placing
‘ the posterior part of her body in each of them.
‘ I continued on the watch most part of the en-
‘ suing days, but could discover nothing of what
‘ I had seen before. The eggs after the fourth
‘ day

‘ day, instead of changing in the manner of
‘ caterpillars, were found in the same state they
‘ were in the first day, except that some of them
‘ were covered with honey. But a very singu-
‘ lar event happened the next day about noon:
‘ all the Bees left their own hive, and were seen
‘ attempting to get into a neighbouring com-
‘ mon hive, on the stool of which I found their
‘ Queen dead, having, no doubt, been slain in
‘ the engagement. The manner in which I ac-
‘ count for this event is as follows: the great
‘ desire of perpetuating their species, which is
‘ most observable in these insects, and to which
‘ end the concurrence of the males seems so ab-
‘ solutely necessary, made them desert their own
‘ habitation, where no males were left, in order
‘ to fix their residence in a new one, in which,
‘ there being a good stock of males, they might
‘ the better accomplish their purpose.

‘ If this does not yet establish the reader’s
‘ faith of the necessity of the males bearing a
‘ share in the fecundation of the ova, the next
‘ experiment cannot, I presume, fail to convince
‘ him. I took the brood-comb, which, as I ob-
‘ served before, had not been impregnated; I
‘ divided it into two parts; one I placed under
‘ a glass-bell, No. 1. with honey-comb for the
‘ Bees food; I took care to leave a Queen, but
‘ no Drones, among the common Bees I con-
‘ fined in it. The other piece of brood-comb
‘ I placed under another glass-bell, No. 2. with a
‘ few Drones, a Queen, and a number of com-
‘ mon Bees proportioned to the size of the glass;
‘ the rest I disposed of as before. The result
‘ was, that in the glass No. 1. no impregnation
‘ happened;

‘happened; the eggs remained in the same state
‘they were in when put into the glass; and,
‘upon giving the Bees their liberty upon the fe-
‘venth day, they all flew away, as was found
‘to be the case in the former experiment:
‘whereas in the glass No. 2. I saw, the very day
‘after the Bees had been put under it, the im-
‘pregnation of the eggs by the Drones in every
‘cell containing eggs; the Bees did not leave
‘their hive on receiving their liberty; and, in
‘the course of twenty days, every egg under-
‘went all the above-mentioned necessary
‘changes, and formed a pretty numerous
‘young colony.’

What he has here said concerning those little Drones is a wild fancy, and what is also very unbecoming; his pretending to have seen so many of them brings him in to be very disingenuous.

I shall give three arguments against his experiments:

- 1st. Can it be thought that the prying eyes of multitudes in many generations should have escaped seeing those little drones (they being, according to his account, vastly numerous) thrust their posterior parts into the cells? Yet none ever saw them do it, except himself; while many have seen the Queen do it, though but a single Bee.
- 2d. It is well known the Queen is very long behind the wings, wise nature having made her so, in order that she might thrust her posterior part

part into the cells, and yet her wings scarcely touch them, nor receive the least injury. If these imaginary little Drones had to thrust their posterior parts into the cells in the same manner as the Queen, certainly their wings would have been made in the same manner short, and their posterior parts long and taper, which is not the case. Whereas were a Bee of any kind (the Queen excepted) to thrust its hinder part into a common cell, its wings or coats would come over its head, and be antic like, and injure both them and its body. Besides I scarcely think they could get into the common cells that way at any rate for want of room.

3d. Mr. *Debrow* grants that without a Queen or eggs, Bees will not begin to work, as well-knowing they cannot propagate their species without her: and yet he says, those Bees which wanted little Drones began to work, and the Queen laid eggs, and all went forward, till they were not impregnated, and then they gave over work, and deserted the hive. Certainly those sagacious creatures would have been as sensible that they wanted Drones at the very first, when they were put into the hive, and that they could not do without them, as they are sensible when they want a Queen, and that it is needless to begin work without her: and it might be added, that two different kinds of Drones in one hive does not appear to be probable, or serve any end.

But

But I shall narrate some of my own experiments on that head, which will put it, I hope, beyond dispute :

On *Sept. 1st*, I had a hive breeding fast ; I took out all her Bees, (among which were only four large Drones, which I killed) and I put them in a hive that had nothing in her but empty combs : I waited ten days, when, by looking between the combs, I saw her have new-sealed up maggots in her cells. I then took all her Bees out, and shook them into a tub full of water, and recovered them gradually ; and when recovering, I pressed every one of them, in order to see if I could find any of those little Drones, but could not find one ; but all and every one of them had stings : they were in number 3000. After which I searched the hive I took them out of, and cut out all her combs that had eggs in them, and found they had new laid eggs, four days old eggs, and maggots in them. I then recovered the Queen and all the Bees, and put in the same hive again, which had not an egg in her now, and waited other twenty days, and saw her, in fine days, working very well, a sure indication she was breeding again ; I then turned her up, and cut out one of her brood-combs, and saw in it new laid eggs, four days old eggs, and maggots, and some young almost fit for emerging out of their cells.

The very same day I made a further experiment :—I had a hive which I saw had some brood-combs in her, but she had not had a large Drone for four weeks before in her : she had not above five hundred Bees in her, which favoured

voured me, because few in number. I took the hive into a close place in my house, in order that not a single Bee should escape me; I then took all her Bees out of her, and immersed them in water, and when recovering, I pressed every one of them, and each Bee had a sting, as in the former experiment.

I think the above experiments may satisfy any judicious person, that there is no such thing in being as little Drones, unless in Mr. *Debraw's* brain. And if Mr. *Debraw*, who can find fifty-seven in a small swarm of Bees, will send me the odd seven, I will send him one of my best hives for them, and he will scarcely think he is ill paid. I add, I never saw a hive in spring, however few Bees in her, but she bred some if she had a Queen, though to be sure few in proportion to her Bees.

By this time the reader will be very ready, no doubt, to ask me the use of the Drones: I beg to be excused on that head, as I have not the least idea of their use in a hive: they do not fecundate the Queen, for she can lay and breed too, though she never see them. Their heat does not appear to me to be necessary for hatching the young, as they are mostly hatched before any are bred in a hive: and when Drones are in the hive, the weather is so warm, and so many common Bees in it, that they appear to have rather too much heat, by their lying out of the hives often.

I have many times had good hives with few or no Drones in them all the year; and *Keys* is quite wrong, when he says a top-swarm will not do without Drones in her, for I am positive to the

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the contrary, as in the summer, 1785, I took off four swarms of mine own in one day, with not a single Drone in any of them, and they all throve well, and bred Drones in themselves about four weeks after.

Although I cannot say what use the Drones are or to a hive, (unless it be to help away with a great deal of her honey, which they are very good at) yet the best hives have them soonest in the year, they generally appearing in such about the latter end of *May*, and the Bees put a period to their lives about *Lammas*, at which time I give them all the assistance I can. The way they kill them is thus—they pull and bite them with their teeth, and sting them also: I have seen great havoc made of them in one day, as appeared by their lying dead before the door of the hive. But their most effectual way of killing them is their banishing them from the honey-combs, upon which the drones betake themselves to the under edges of the hives in great numbers, and to the board the hive stands on; and sometimes, though rare, I have even seen them come to the outside of the hive, and cluster there, about the bulk of a man's hand. When they are banished thus, they are very dull and lifeless: and I have lifted up a hive from the board, and there they would have been sitting close on it, with scarcely three or four common Bees among them, and I have trode to death forty or more at a time.

We may now take a view of the disadvantages attending the old, and also Mr. *Debraw's*, principles on Bees, were they true; and next see

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how a hive of Bees may be preserved from coming to ruin, according to my sentiments on them:

- 1st. The old principles on Bees say, that without a Queen or royal cell be in a hive, it will come to ruin.
- 2d. Mr. *Debraw's* principles say, that without little Drones be in a hive, it will come to ruin.
- 3d. I say if a hive have only new-laid eggs in her (which may be easily got the greatest part of the year, in case she have none of her own) and common Bees, she will find herself a Queen, and so thrive.

According to the old principles it is easily seen that, in case a hive lose her Queen, when there is no royal cell in her, and no Queen can be got to put to her, (neither of which can be expected but in *June* and *July*,) she is entirely ruined.

According to the *Frenchman's* scheme, there must be Drones in a hive at all times of the year to fecundate the eggs, otherwise the hive is useless. Supposing his sentiments to be true, (which however can by no means be admitted, seeing there is no such thing as little Drones) how perplexed would the owner be to know when there were little Drones in his hives! When he wanted to make an artificial swarm, he might bring off a Queen and common Bees with her; but how should he come to know whether

whether there were any, or a sufficient quantity, of little Drones among them, as they cannot be distinguished from the commons but by immersion and pressure, which would be intolerably troublesome, and next to killing the Bees, and not at all practicable? all that could be done would be to hope the best, that there were little Drones in her at any time of the year."

I say, if a Queen die in a hive, and that hive have some new-laid eggs in her, or some put to her, in case she have none of her own, she will nourish up some of these eggs to be a Queen to herself: and also by taking out a Queen and some commons out of a hive, (without a single Drone, large or small) and putting them in an empty hive, will make a swarm, and the old hive will breed herself a Queen again, if she have eggs in her.

(The reason why I have dwelt so long on the history of the Queen and Drones is because I had the old erroneous points held by writers on Bees to overthrow, and my own new principles to establish from arguments and narrations of facts.)

C H A P. VIII.THE HISTORY OF THE WORKING BEE.

THE Working Bees are seen by every one that has them, and scarce need any description. They are the least of the three, and those that work for the whole hive. A Bee is a flying insect consisting of three principal parts, viz. the head, which is attached by a kind of neck to the rest of the body; the middle or breast; and the belly, which is distinguished from the other by an inflection in the middle. The head hath two eyes in it, which are immoveable, of an oblong figure, black, and transparent: the mouth or jaws, like the mouths of some fishes, open to the right and left, and serve instead of hands, to carry out of the hive whatever offends or encumbers them. They have a long tongue or trunk, with which they suck up the sweets out of the flowers. They have four wings in all, and it is by them they fly, and make sounds and hummings to one another, which is thought to be their whole organ of speech: their wings are fastened to their middle part. They have also six legs fastened to the same part; the two foremost are the shortest, and with them they can unload themselves: the two middlemost are somewhat longer; and the two hindmost are longest of all, and on the middle joint of them there is on the outside a little cavity in the shape of a marrow spoon:

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it is on this hollow that the Bees collect, by little and little, those loads they carry home to their hives. It is observable that neither the Queen nor Drones have this groove. The last part of the Bees, which is the belly, is distinguished with six rings: in the inside are two parts; the one is a little bladder or reservoir, in which is collected the honey that the Bees sip in the cups of the flowers, after it hath passed through the proboscis, and through the narrow pipe that traverses the head and breast of the Bee: this bladder, when it is full, is of the size of a small pea; it is transparent in such a manner that you can see through it the colour of the honey it contains. The other remarkable part is the sting, which is situated at the extremity of the belly of the Bee, and which is darted out and drawn in with great quickness by means of certain muscles placed very near the sting. The length of the sting is about two lines; it is a little bigger towards its root, than near its extremity, which terminates in a point: it hath the consistence of horn; is hollow within in the manner of a tube, wherein passes the venomous liquor, which being included in a bladder placed in the belly, and at a little distance from the root of the sting; this discharges itself near the point, and insinuates itself into the wound the very instant that the Bee pierces the skin. The Bee almost always leaves the sting in the wound, and it draws after it the bladder, and sometimes a part of the entrails of the insect.

These Bees are, I may say, the whole community, unless in the Drone season, which is scarce-

ly three months; all the other nine months there is none other in the hive but one single Queen. They are the Bees which build the combs; collect the honey in the fields, and bring it home, and store it up in their waxen magazines. They nourish up the eggs to be common Bees, Queens, and Drones: they also guard the hive from all enemies of whatever kind; carry out all incumbrances that are in the hives, and kill all the drones, &c.

Notwithstanding all that ever has been wrote and said concerning Bees, their sexes cannot positively be ascertained as yet by any man: I for my part leave it to future enquiries, for it as yet remains a mystery to me. And as to the Drones, I know not their use; only this I affirm as fact, that the Queen lays all the eggs, and that without the agency of the drones; and also that every egg can be raised up by the commons to be a queen, a common, or drone, as the commons please. I also affirm that there is no such thing as little drones. I am also certain that the queen and commons can perpetuate their species between themselves; which is conclusive they two are male and female, although no writer ever before asserted it.

It is said of the snails, that they are all hermaphrodites, and that both the sexes are contained in each of them.

C H A P. IX.OF THE STING OF A BEE.

AS we are now to go forward to handle Bees, it becomes us therefore to guard ourselves against their stings. In the first place, Bees seldom use their stings, unless provoked or affronted; therefore you must beware of giving them the least offence, for they will hazard their lives rather than let an affront pass unresented: for exasperate them near their hives, you may as well take a lion by the beard, or a bear by the tooth, as offer to capitulate with them: in such a case the only thing to be done is presently to scour off, and shelter yourselves within doors, and peep out at them, till once their fury be abated, and the remembrance of the affront be obliterated; then you may renew your acquaintance with them, and if you come in an humble manner, and walk gently and submissively among them, they will use you very friendly. In all things you have to do with Bees, do it in a soft, calm, gentle, and submissive manner: come not among them in a rash hasty manner; neither must you come puffing and blowing, nor with bad smells about you. Come to them in the same manner you would appear before your patron, when you want a favour at his hand, and not as before a duellist, unless you be armed cap-a-pee.

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When Bees are offended at a person, the chief part they aim at to wound him in is the face and hands, being the places they know are most vulnerable. But in case those places be covered, and proof against them, then they will surround him all about, in order to see if they can spy any unguarded place in his coverings, any aperture or crevice about his shirt, hands, breeches knees, &c. and if they find the least opening in any of them, they will push in at it, and so leave their sting, and very life, behind.

The hair of the head, beard, or eye-brows, are all very offensive to Bees, any of which if they accidentally light on, (although in good humour before) they will sting the very instant. It has been lately affirmed, that a person is in perfect safety among myriads of Bees, if he carefully keep his mouth shut, and breathe gently through his nostrils only: and merely with this precaution, it is said, the hive may be turned up, and part of the combs cut out. I do also believe, it is very good not to blow one's breath on them, when they are in the furious mood; but when combs are to be taken out, they must first be frightened into good humour, by rapping all round their hives; after which you may blow as much breath as you please on them, they will not in the least resent it, but will suffer you to handle them, or cut out their combs, as you please: and that is the alone way to tame Bees, viz. to frighten them; after which they will not in the least offer to sting, if you do not press them. When at work in the fields, they never offer to sting, let you affront them as you please; you may chase

chase them from flower to flower, and yet you cannot tempt them to sting, but they will fly from you, as unworthy of their notice.

When you have any business to do about your Bees, which may provoke them to sting, and yet must be done, such as making them swarm, uniting hives, &c. then you must have on your harness, and keep it on as long as they are furious; but whenever they are frightened and surprised, by rapping on the hive, they will be very pacific, and never offer to sting you. After which, throw off your safe-guard, and also your coat, by which you will be more fit for performing your business with them. When I take a swarm of Bees out of a hive, I first put on my harness, and then invert the old hive, and put an empty hive above her; then I rap the old hive all round, which confounds, frightens, and terrifies them so, that they turn quite peaceable, and never offer to sting me more: then I throw off all my armour, and coat also, by which I have more air and freedom to finish my business with them.

In case Bees disturb you much when walking among them, gently put them by your face with your hand, and move slowly away from them, and thrust your head into a bush, and they will leave you in a little.

All the harness I use is a piece of thin canvas, wove very slack, a yard square; this I put over my head, and drawing it together about my neck, I fix it with a garter. I then put on a pair of gloves, causing a person to tie my coat-sleeves close on above them, so as not one Bee can get up betwixt my arms and sleeves.

sleeves. The canvass being wove almost as thin as a sieve, permits me both to see and breathe. Indeed it is only some times I trouble myself with any incumbrances of that nature, for instead of that, I generally strip myself ere I begin, when I judge I have wife and mild Bees to deal with; and many swarms have I taken off, and not received a sting.

Mr. *Keys* says, there have been too many melancholy instances of men as well as cattle who have been stung to death by Bees. I never read nor heard one single instance of any such thing, unless of one who was put in a cage, and covered over with honey, on purpose for Bees and wasps to sting him to death.

The stings of Bees have very different effects on different persons; for there are some men to whom the sting of a Bee does not occasion any pain or inflammation; and they disdain using any precaution, even when they are sure of receiving many stings. Others again are terrified for Bees, their sting in them causing an exquisite pain, and followed by great swelling. The sting of Bees has very different effects on me at different times; the seldomer I am stung, the more pain I feel, and swell the more; if I am stung once in three weeks, I feel some pain and swell a little; but if I be stung once, twice, or thrice in a day, I value them not a pin: I have received twenty stings in a day, and swelled scarcely any. The reason I pretend not to account for, but leave it to those of more penetration to discover.

Cure

Cure for the Sting of a Bee.

THERE have been many remedies prescribed (to little purpose) to cure the wound received by a sting. Oil of olives, or any mild oil is thought by many to be a cure; bruised parsley gives ease, say some; the honey taken out of the Bee that inflicted the wound is thought a good cure; the sweet spirit of vitriol well rubbed in the wound will prevent pain or swelling, says Mr. Keys. Repeated experiments oft shew that the ease received from any of the above remedies is but seldom, and may rather be imputed to an accident than a cure; yet I make no doubt but they may give ease sometimes.

The sting and poison is ejected in a moment, and pain and swelling take place the same instant, when the cure is often far to seek and ill to find. The moment I receive a sting, I pull it out, and takes a kail dock, ash, or almost any green leaf which is soonest got, and is always at hand, and bruises it a little, and rubs it in the wound. Sometimes, if near water, I wash the wound, or apply a wet and cold cloth to it, and have thought it sometimes gave me a little ease; but it is not one in a dozen I apply any remedy to at all, for it seldom makes me uneasy, and I know a little patience and time compounded together will make an effectual cure.

C H A P. X.

OF THE APIARY.

AS a general rule, set a hive where she will get as much sun and as little wind as you can; and keep all cattle of whatever kind from her. The farther she is from any other hive she will thrive the better; not because they will impoverish the flowers, for this is scarcely ever the case, but the farther from other hives the less danger from robbers; for in fine weather when there is no honey in the fields, and many Bees near other, they will constantly be trying one another's hives in the robbing way, altho' strong hives suffer little or nothing by robbers, yet weak ones constantly are losing Bees by them, as any one may see, where there is a multitude of them in one apiary: and this is the chief reason, and none other, that Bees do not thrive so well where there are many in one place, as where there are few.

Therefore I would advise any one that wants to keep a large quantity of stalls, perhaps twenty or thirty, or as many more as he pleases, to have no more stalls in one apiary than six; and if he can have that much room, each one of these hives six yards from any other; that is an excellent method to prevent scrabbling and fighting. I do not mean that Bees will not thrive well when thick set, for one may have four good stocks all within

within two feet of each other and do very well: all I mean is, that they will thrive the better by being far between, but cannot thrive the worse, as by the above: I have said six is to be set in one apiary, and you may have other six within a quarter of a mile of them in the same manner, and so on, you may cover *Britain* with them, that thickness, if you can, if flowers are within their reach. I think by this time Mr. *Keys* will be saying, Where is the food for such a prodigious number? for both Mr. *White* and he say, a field may be overstocked with Bees, the same way it may be overstocked with sheep. I do not deny but there is a possibility of it, but it will not be so by setting them as thick as I have directed.

In the honey season if we consider the vast number of flowers the earth produces in spring and summer, and that scarcely one of them but Bees gather of. If one pass by a clover, mustard, or heather field on a fine day in the honey season, the whole air smells of the sweetest nectar; the flowers of which are numberless, and the sockets like the sand on the sea-shore: and yet every socket has a little honey in it. I dare to say that one acre of either white clover, mustard, or heather, will produce twenty pound of honey in one day, besides almost every tree, corn field, and all kinds of weeds produce flowers.

When the flowers are sapped at their roots, and a fine sultry season, they are continually sweetening honey through their pores. A hundred hives which are well stored with workers, set in one village, will get all good weights and
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thrive well; whereas in a cold or rainy season, suppose there was only one hive in the said place, she will be a poor one, and it is not for want of flowers that honey is scarce in this land, but for want of good seasons and labourers to bring it home. Mr. *William White* says, 'I have heard several persons unacquainted with the nature of Bees argue, that a place may be overstocked with Bees, as well as sheep on a pasture; but I will assure my readers it is not so, for I have proved the contrary; for if there were an hundred stocks in one town, (*viz.* a small village) and it should be a honey season they would be all good weight; and if it should be a cool showery time in the height of the honey season, if there were only one stock in that town, they would not be heavy enough to stand; for I can assure you there is plenty of honey one day, and none at all another.'

What has been said here does not contradict the directions given to set hives thin, the design of that being to keep them from fighting in spring and autumn, for they do not rob in the summer season. When they can get honey from flowers, they will not steal it, and you may set a hundred and fifty in one park, if you please, of forty acres large; and if you set each hive six yards from any other, they will find plenty flowers for themselves in summer, suppose they should fly two miles for some of them; only be sure to set them as near as you conveniently can, for the nearer they are them, the more loads will they bring home in a day, and thereby fill their store-houses the sooner.

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I have often thought, had I exactly my wish where to set Bees, it would be in a hollow glen, with a large wood on one side, a large garden on another, a white-clover field before them, and a large heather muir intermixed with a deal of whins and broom behind, with some wild mustard and runches to fill up the corners.

C H A P. XI.

HOW TO CHUSE STALL-HIVES IN SEPTEMBER.

HAVING fixed on the apiary, let us next fill it with proper inhabitants: and we must be very pointed here, as our profit and pleasure, loss and vexation, in all our management of Bees, generally turn upon this hinge. Therefore you must be very attentive in chusing your stall-hive; for if you keep good stalls you have done yourself a good turn, but if you keep bad ones, I promise you a great deal of trouble, and little success, and soon a broken Bee-master.

You must consider, that in *September* every stall ought to have as much honey in her as will supply her till next *June*; and as many Bees as will maintain heat in her, and thereby resist a severe cold winter, and be so many able soldiers to defend her from invasions in the spring.

As I intend to dissuade every one from keeping hives that have not a sufficient quantity of honey in them in harvest to supply them till next *June*, I shall shew the risks that are run by keeping bad stalls, and the little profit that attends them even when they do come through the winter and spring, which seldom happens. And in the first place, a bad stall, such an one as has not a sufficiency of honey and Bees as will supply it with both food and heat till *June*, is not to be trusted; for it is the greatest prudence, in all the management of Bees, to keep always good stalls.

A hive that has not honey enough to supply her till *June* must be fed, otherwise she will die of famine: and if a hive takes four pints to bring her to *June*, and has only two pints of her own, then you must give her other two, by which she will cost you as much honey, and a great deal of trouble, and often set your Bees a fighting, unless you be very prudent in your way of giving them their honey. At any rate, the Bees are sure to take a good belly-full in the first place; and I am certain that in the best method that can be taken to feed Bees, they will spend more honey than they do when they have it to pickle out of their own poke-nook: not unlike some of a higher species, that are very moderate of diet in their own homes, but can make very merry when abroad, and nothing to pay.

By feeding in spring, when the weather is good, and no flowers in the fields, all the Bees in the neighbourhood will smell the honey,

Of chusing Stall-hives in September. 1777

honey, and very often occasions great fighting; and it brings the Bees down from their brood, and many times perishes them in the cells. I own, that by taking great pains, and giving them it properly, some of these inconveniencies may be prevented; but often it happens otherwise. And should one feed them painfully till *May*, and inattentively miss two or three days when their honey is done, then they will die at the mouth of honey-harvest, and all your honey and trouble is lost. Again, if you keep a hive not sufficiently stored of Bees, they will dwindle away gradually by cold and age in winter, and probably become a prey to robbers in spring: and if she should come through, it will be long ere she turn throng of Bees, and perhaps miss swarming next season. But to make short work, a bad stall runs a risk to die of cold, famine, and by robbers, and if she escape those dangerous rocks, will bring home but a small freight next year.

But a well-chosen stall seldom but does well, and rewards the owner with a double-stock next year. She runs no risk to die of cold, having plenty of Bees; nor to die of famine, being well stored with provisions; neither by robbers, being filled with well-trained and armed soldiers, and bids fair for a well-filled house next year, having many workers; and many children next year, having a prolific mother and many nurses.

By this time, I hope, the reader will take care what stall he keeps, and now wants to be informed what hives are fittest for stalls; I shall

therefore inform him what will be for his profit and also pleasure.

If a hive be well stored with Bees, and 30 lb. weight, and not above three years old, it is all you need; if a top swarm, or one year old, still the better: but you need not fear, though they be four or five years old, if they have these two essential parts of a Bee-hive—plenty of honey and Bees: but beware of the want of any of these two ingredients, lest you rue when you cannot mend it; for if you want any of these two ingredients in your hive, I tremble to think what will be her fate next spring if she have the luck to see it, for stern cold, grim famine, and the merciless robbers will find out where she lives, and shew her not the smallest pity. But if those two trusty brothers, honey and bees be in her, they will make these rogues run from her like lamp-lighters. These two honest fellows do well together, for they cheer up one another, and keep up other's hearts: but if one of them desert the house in a great measure, the three rogues will fall on her again might and main, and the discouraged brother will become a prey to their avarice.

In order to know whether your hive be well stored of bees, turn her up, and by looking at her you will see if there is plenty of bees among the combs: and indeed a hive that is 30 lb. weight seldom wants bees enough. The way to weigh it needs scarcely be directed:—have a bawk and scales beside her, and put her, without her board, in one scale, and your weights in the other, the same way as any other thing is weighed, and you will see her weight. You need

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not be afraid of their stings, if you go gently about them, especially if the day be cold, and you take the early morning or evening: but for my part, I can do it at any time.

C H A P. XII.

HOW TO PRESERVE BEE-HIVES IN WINTER.

WHEN you have settled upon your stalls, whatever number, the more of those kind the better, set them as I directed formerly, viz. every one six yards from another, if you can do it conveniently; but in case you have little room, and perhaps only three or four stalls, you may set them within four feet of each other. When you have fixed on a place where a hive is to stand, drive three stakes into the ground till the tops of them be within ten inches of it, and the foremost stake an inch lower than the other two; then set your hive on them; after which at sun-set plaister the skirts of the hive all to the board with plaister-lime; next take a little piece of hard wood, and cut two small holes in the under side of it, wide enough to let out and in the largest bee, but no more, for was it much bigger, the mice would go in at it: therefore you must be very exact with your entries; each hole should scarce exceed a quarter of an inch high, and as wide: then fix them to the entry of the hive with a little lime; and next get a large quantity

quantity of peb tow, or straw, if you cannot get tow; and cover your whole hive over with it, about eight inches thick: then fix it to the hive with straw ropes, and put a large divet on the top of the tow or straw, which will hold it close down to the hive, and keep them both dry and warm: afterwards row up some of the tow or straw just three inches or so above the entry, and six inches at every side, for the less of the hive is seen, the dryer and warmer it will be; and in the very middle of winter, if you put a bunch of straw among your stuckens, and set the hive above all, it will be still warmer. This being carefully done when the weather is dry in *September* or *October*, you need scarcely touch your bees till mid-winter, about which time you may lift every hive, and carefully clean their boards, with a table-knife, of all the rubbish or dead bees that may have gathered on them; at which time you will see what state your hives are in; and in case any of them is reduced to a small quantity of bees, you may strengthen her by taking a proper number from any of your hives that is plentiest of them: and if any of your hives be lighter than another, take the bees from her; and in all your uniting of bees, strive as much as you can to unite those that are of the best natural tempers, for there is a great odds among them.

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*How to take Common Bees * out of a Hive at any Time of the Year, to strengthen weak Hives with.*

TURN her up, and set an empty hive on her, mouth to mouth; then rap the under hive all round with your hands in the manner of beating a drum, rapping on the parts of the hive to which the edges of the combs are fixed: for by rapping on the hive opposite to the sides of the combs, you are ready to loosen them, and thereby make them incline to one another, and bruise the Bees between them, and also the young enclosed in the cells; and perhaps the queen may be a sufferer also. When the hive is turned up again, in order to set her on her board, I have seen the loose combs fall out; all which is a great loss, and may be prevented by rapping in a right manner. The older a hive is, the less hazard there is of loosening the combs. The more bees in a hive, the sooner will they fall a running: the rapping and concussion of the hive alarms them, as if an earthquake, and they run up to the upper hive in search of a more safe habitation; the first few that enter it think they are safe, and roar, and thereby call and invite their brethren to the same comfortable retreat. They will soon run up into the empty hive: then lift up the edge of the receiver,

* By Common Bees here is meant those that have no Queen among them, though they have Drones.

ceiver, which is next your right hand, and look diligently to see if you can spy the Queen going up among them; which if you see, you must return her to her own hive again. Do it in this manner—take a spoon, and put before the Queen, and cause her to run into it, along with some of her companions: after you have her in the spoon, take it, and put to the edge of the hive she came from, and she will run in again. But as soon as you have got as many bees out as you want, and have not seen the Queen go up with them, and yet are not certain whether she be up among them or not, then turn up the hive that the bees are put in, and stir among them in order to cause them to run much in the hive, by which you will have an opportunity of seeing her, if she be among them; but if after all your diligent search for her, you still cannot see her, it may be presumed she is still in the mother hive: but you must not be easily satisfied on this point, as it would be of dangerous consequence to the old hive to take her Queen from her; in case she had no eggs it would entirely ruin her; therefore set down the hive with the bees in it, and let them stand, and if they have a Queen, they will stay as quietly in it as any other swarm, but if not, they will come running out in a confusion, by which you may be assured they have no Queen, and are only all commons, and are what you wanted, and at this instant they should be put to the hive you wanted to re-inforce.

How to put common Bees in a Hive, to strengthen her.

HAVING got common Bees in an empty hive, turn it up, and set the hive you want strengthened on her, mouth to mouth, and they will soon run up: after which set the united hive where the strong one stood, and the strong hive where the weak one stood, or in other words, change their stance.

Another Way of re-inforcing a Hive.

IN Summer, I have taken common Bees in spoonfulls out of the empty hive they had been put in, and laid them before the hive's entry I wanted to put them to, and if they received them peaceably, I continued to fill her with bees in this manner: but if they fought much, I returned the common bees to their mother-hive again, or tried if some other weak hive would receive them kindly.

Another

Another Way.

I HAVE only changed their stance, setting the strong one where the weak one stood, as you will see in page 21.

All these different ways I have had them reinforced, and they have given me great satisfaction; and if done in a prudent manner, not one of a dozen will fight scarcely any, though indeed sometimes some bees will fight, let us do our best. Even the same hive will not receive strange bees one day without fighting, that will receive them kindly the next. I have often seen a hive, when uniting, kill a hundred or so, and afterwards proclaim peace. But in Winter, I can unite as many as I please, and no fighting at all.

Some may ask, where will we get all these common bees to strengthen weak hives with? I answer, if you have been a wise man, and have chosen good stalls, you will scarce ever need this uniting, as every one will have bees enough of her own, and need none of your assistance, but even in the best chosen stalls sometimes it will happen that they will be reduced in number *, and therefore ought to be strengthened.

* The reason some hives come to have fewer bees in winter than others (although equal with them in September) is various:—If a hive in summer be but small, and the season good, the Queen may not have empty

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* A positive number is not here meant, as sometimes far more may be taken, and sometimes less.

few full cells of honey, she will fill them with young bees.

But be sure when you take any bees out of a hive at any time, always to leave plenty bees in the mother-hive; for by taking too many out, you may not leave enough to keep heat in the hive to hatch out the brood in the combs, and thereby they will perish, which will be a great loss; therefore beware of destroying one hive to mend another.

At all times of the year, whenever you have a hive reduced in number, be sure to strengthen her with Bees. In winter it must be done to preserve the hive from cold; in spring, to make them hatch fast, and preserve from robbers; in summer, to make them hatch fast, and lay up honey; for few Bees in a hive in summer will only disappoint the owner: whereas many will have honey if it be to be got. Therefore in winter you must take care your hives be not few in Bees, for fear the cold reduce them by little and little, and perish them at last. In strong frosts lay a little tow at their entry, to prevent too much of cold air to get into the entry; but take great care they be not close shut up, for as they have lungs, they must have a little air to breathe in, but by being close shut up, many a hive is suffocated even in winter: therefore take this as a caution, and never let them want air no time of the year; but by applying tow or grass to their entry, not pressed, it admits air and prevents cold. A certain degree of cold is necessary for Bees in winter; that which pinches them and benumbs them so as to keep them in their hives is necessary, for
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when they get seldom out to exercise themselves, they eat but very little, though they constantly eat some.

The greater exercise Bees have, the more food they eat, as may be easily observed; for as soon as a hive gives over work, about the middle of *August* commonly, and a large quantity of Bees in the hive, and the weather still good, their flying about gives them an appetite, and their hives turn lighter very fast, till about the middle of *October*; after which they come seldom out of the hive, and eat but very little during *November*, *December*, *January*, and *February*; but in *March* and *April* they are keen of robbing and searching about for food, and thereby their appetite is very great, and they eat the remains of their winter store fast away. In the month of *September*, *March*, and *April*, I believe they eat as much honey as they do in the five cold unactive months. No doubt their consumption of honey is as great in the four principal working months when their exercise is great; but it is not so observable, because if much be eat, more is their income.

By the above computation, it is not meant that this is their exact way of spending, because it may happen that bad weather may keep them in their hives in *September*, *March*, and *April*, then their consumption will be less; and good weather happening in the winter months, may give them more exercise, and thereby occasion more food: I only mean that the above is their most common way of spending, according to their numbers; for often a well chosen stall at the beginning of *May* will have five or six

pound of honey in her, and so much the better; none should be run out in *April*, or *May*, by three or four pound. Some writers have said that in strong frosts Bees eat none at all, but are motionless; 'and if such a frost continue for 'two or three months,' says Mr. *Stephen White* *, 'without intermission, you may observe through 'your glasses that the Bees are all this time 'closely linked together in clusters between 'the combs, if they are not altogether without 'motion; yet it is certain they stir not from 'their places while the cold continues, and 'therefore eat none at all.' Mr. *Keys* says †, 'It 'must be considered that Bees are capable of 'resisting cold only to a certain degree; that 'which reduces them to a lethargy or torpid 'state is salutary; for thereby becoming motionless, perspiration and circulation of the 'fluids are stopped, and the consequent dissipation prevented. In this state any fresh supply 'of sustenance is unnecessary ‡.' That Bees eat

* Page 10.

† Page 291.

‡ What a pity it is but such doctrine was true; that Bees could feed on cold, what a nice cheap way of feeding, and of what consequence would it be to Bee-masters; it would be only keep them cold, and then keep as many hives as you please!

But alas, notwithstanding the prolific brains of those gentlemen that assert it, we have no other proof of it yet, than mere conjecture, and random affirmations, which stubborn truth and fact will not admit of as a clear demonstration; nor hath the brightest genius by the deepest researches, (as yet) discovered a method to maintain Bees on any other thing than food; therefore

eat none at all for two or three months, as *White* says; and they turn motionless, perspiration and circulation of the fluids are stopped, dissipation prevented, fresh supply of sustenance is unnecessary, as *Keys* says, are mistakes, as may easily be observed by any attentive observer.

1st. If Bees be long confined in their hives in winter by frost, perhaps two or three months, if the hive be lifted off the board, there will be seen three or four rows of crumbles of wax, not unlike saw-dust, lying just below the Bees, which are the ceilings of the cells containing honey, all broke into small crumbles by the Bees, when they opened the mouths of them to get at the honey. Certainly, if motionless, and eat none, no possibility of so much stuff below them.

2d. When they come out after such long confinement, they will be full of excrement, a certain sign they have eaten.

3d. And in the middle of such long frosts, I have had Bees lay eggs, nourish the young, and seal up the cells they were in. Certainly, with Mr. *Keys*' leave, we may affirm they had perspiration, circulation of the fluids, and even food was necessary.

4th. Let Mr. *Keys* drive the Bees out of a honey hive, and put them among empty
I 3 combs

therefore we are just where we were, and must still follow the old fashion; and (that is) keep our Bees warm, and allow them food always, till we want their death.

combs in another hive, and keep them just as cold as those in honey hives beside them, and eight or ten days will make him sensible whether Bees can live in cold without honey, and let him see food is not unnecessary even in cold weather.

The difference of situations, dispositions of places, qualities of hives, and number of Bees in a hive, all make a difference of heat and cold in hives; yet this we may safely infer, that the greater quantity of Bees in a hive, the less danger they will be in of suffering by cold. Therefore a hive should be well stored of Bees in winter, and the fewer Bees in a hive, so much the warmer should she be kept. Mr. *Keys* says *,
 ‘ But here occurs the grand difficulty, *viz.* that
 ‘ of knowing what degree of cold will keep Bees
 ‘ in the beneficial state;—and whilst the
 (plenty) ‘ Bees in one hive shall be consuming
 ‘ their provision,’ (by being warm) ‘ those’
 (few Bees) ‘ in another shall be expiring of cold.’

The difficulty is not so great as said, for keep as many Bees in a hive as you please in winter, she will not be over warm, if keep her entry open, neither will she consume her honey to any excess, for she will only eat to satisfy nature and no more; and no wise man will begrudge her that, if he wants her to live.

As to a hive that has few Bees in her, she ought to be reinforced if Bees can be had; but if no Bees can be got to strengthen her with, she should be placed and covered so as to make her

* Page 292.

her sufficiently warm, that you may know the right medium. I say be not afraid of Bees being too warm in your apiary, if you give them sufficient air; nor need you fear gluttony by too much heat; but keep weak hives as warm as to see every Bee in motion when you turn them up.

In severe storms take care your Bees do not suffer by cold; turn them up and look into the hive, and see if your Bees be all alive betwixt every comb where they are closely sitting and linked together; if they stir with their wings all is well, clean their board and set them down again, and cover them, and carefully keep them dry and as warm as you can, to admit air: but if instead of being clustered between the combs, they fall down in numbers on the stool, and some of the outside layers between the combs stir not, then they are starving of cold, and you must bring them into a warm room, and they will soon recover, and set them in some moderate warm place, and keep them there till the cold remove, and then set them in their old stance again. Do it an hour after sun-set, and they will not stir out of their hive that night; for when confined in the hive some time, perhaps in a dark place, and they are returned to light and liberty they are fond of it; and many would come out and kill themselves by lighting on the cold and wet ground: but by standing out all night the cold would pinch them, and the light coming gradually to them next morning, would not surprize them so much, and after long confinement let them not out at any rate till a fine day.

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In snow, when the sun shines bright, and bees have been long confined before that by unactive weather, they are keen to be out, being excited by the glaring light, and heat of the sun: especially if the season be advanced to *February*, they will come rushing out, if allowed, to their own destruction, and alight on the snow; the coldness of which gradually seizes them, and they die in multitudes: therefore in such weather be sure to suffer none to get out: prevent them by laying tow before their entries, and a stone before it to bear it to them, but so as to admit air; and let every part about the hive be carefully viewed, to see that they get out at no other aperture; for if they did, the cure would be worse than the disease; by their coming out at any other part, they would alight on the snow, but those that escaped the snow, would fly to their common entry, in order to get in again, but would be prevented by its being shut, and therefore would soon die also.

Many ingenious gentlemen have tried several methods to preserve bees in winter: some have shut them up in cold out-houses from *September* till *April*, and some from the first of *November* till *March*. Others put grates before their entries to admit air, but keep them in their hives.

The limits of this performance will not admit to shew the unsuccessfulness of these inventions; suffice it to observe in general, that a long confinement is not healthy for them; besides as they eat a little, it is necessary that they should get out to void their ordure; for I have
often

often seen bees that have been long confined so full of excrement within, that they swelled to a great size, larger than a queen-bee, and as soon as they got liberty to get out of their hives, being unable to fly to void their ordure, they would run over at the edge of their board, and creep about till they died in great numbers, and scarcely one in twenty ever for any more use. But when they get out now and then, in fine winter days, they air themselves, ease their bodies in flight, trail out their dead bees, and return to their hives again, and take themselves a song, which is a sign they are happy. Experience tells me, and I believe, almost all others, that bees thrive best by standing out in the common method, with liberty to go out and in to their hives, when they find a call for it. They have the sagacity to know when they may venture out without hazard; and they will come to the door of the hive, and ease themselves, and return again to their companions.

Hives should be placed on boards, for they are warmer in winter and colder in summer; besides they suck up the water that the heat of the bees make, (which we call sweating) or any other wet that may get in at any time.

Boxes are not near so warm as straw-hives, therefore they should have more covering on them by far.

Most all writers say, that a fine winter is dangerous for bees, and far more die than in a cold one, alledging that their going often out increases their appetites, and they spend their provision, and thereby often die of famine; whereas

whereas being long confined in their hives in bad weather, they scarcely eat any at all.

I own that in a fine winter, they eat some more food than in a winter that they scarcely get ever out by cold or cloudy weather; but in a fine winter the bees getting often out in sunny fresh days, it is greatly for their health, and they die not of cold; besides they fall a hatching, and thereby keep their hives fuller of bees. It surprises me to hear writers assert such mistakes; for experience, (which is better than conjectural reasoning) may convince every one to the contrary, that far more hives die in cold winters than in mild ones. I have sundry years seen, particularly in the winter 1779, which was a remarkable fine one, that year not a hive of twenty died, and they swarmed a month sooner than ordinary; whereas in the winter 1776, being very cold, there was a great death among bee-hives: if a countryman had four stalls in his apiary at *Martinmas*, the cold reduced them to three, or perhaps two, before *March*; and the few swarms that were the following summer, were both small and late.

When the frost is very strong so as to lay ploughs, and water freezes in houses, then you may set your hive in some out-house, and keep them there till good weather comes, and then set them in their stance again; but if covered well, and their entries stopped with tow, as directed, they will not be hurt with cold, altho' standing out in your apiary.

I have seen a hive that had been long confined (perhaps ten weeks) by cold, when fine weather returned, and the bees came out, very
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great numbers of them would have died in a day or two, and the hive would have been greatly reduced: I judged that their long confinement had made them diseased.

C H A P. XIII.

OF THE PURGINGS INCIDENT TO BEES IN
WINTER.

WHEN bees are long confined at any time of the year, they take a looseness, and purge greatly. Some writers say, they have this looseness only in the spring, by their feeding greedily on new-blown flowers; but it is a mistake; for they have it at all times, if long confined; for they are so cleanly, that they seldom or never void their ordure, unless when flying; which may easily be seen, if they fly over or light on snow or linen clothes, it falls on them in brown spots. Some give directions how to prevent them from taking that looseness, and also how to cure them that have it, and that is by keeping combs in the hives containing bee-bread or farina, imputing the disease to arise from their eating only pure honey. These gentlemen only discover their unacquaintance with bees, for it arises from their long confinement, and from no other reason, as appears by common observation: if hives that wanted bee-bread only purged, then it might be imputed to that cause, viz. the want of that kind

kind of food : but hives that have plenty of bee-bread in them purge as fast as any, which lays that argument aside. If they purged only in spring, when they feed first on flowers, it might be conjectured that it arose from that reason, but it is so far from being the case, that they purge at all times when confined, and instead of purging more when they get flowers to feed on, they give it entirely over before ever flower-time comes on. If the weather be fine, and they can get only flown about, an hour or two, the cure is effected, as soon as their bellies are emptied of the ordure that has encreased during their confinement. I am never better satisfied than to see them rain it away when flying. The only method to prevent bees from having that purging is to let them always have their liberty ; and the same is the cure when they have it, and that is to let them get out to void it.

But in case the weather be unfit for their coming out for a long time, you cannot help it by any method you can use.

It is certain, when bees are set in out-houses in storms, they of necessity must continue in the hives, and thereby cannot get out to void their ordure ; but they are in the same case when standing in the apiary in such bad weather, as they cannot get out ; and in both cases they are alike as to voiding their excrement.

Mr. *Keys* thinks cold foggy air is very pernicious to bees in winter, and asserts it as the alone cause of their excessive purging, for, says he *,
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'preserve them from this' (air), 'and the frost
'will bite in vain.'

I cannot believe any such thing, for this reason—were cold foggy air to produce this severe purging in bees, then all hives that stood out in such air would have this disease; whereas I know for certain that one hive in an apiary will have it in a severe manner, and very many bees will fall down to the board in her, and die of it; whereas another hive standing just at her side, with the same number of bees in her, and partaking of the same cold foggy air, will be not in the least hurt by it, but in a fine day after her confinement, will fly about, and ease their bodies of it, and scarce any one dies of it in her. Again, were the said foggy air the alone cause of their severe purging, all hives that stood in dry rooms would have no such diseases, whereas it is certain that two hives, having the same number of bees in them, and standing in the same warm and dry room, the one will have it severely, and many of her bees die of it, and the other no ways injured by it.

Bees that have that severe kind of purging are always keen to get out of the hive to void it, which appears to me their confinement is the cause of.

There are two degrees of purging, the one all Bees have after confinement, and it hurts them nothing; the other only some hives have, and it reduces their bees greatly. In short, I have often been sore perplexed to see some of my bees dying constantly in their hives of this severe kind of purging, while others that stood

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just

just beside them, and were as much confined, yet had it only in a small degree, and were not in the least hurt by it, for as soon as the weather turned good, they got out and voided it, and were as lively and healthy as ever. And indeed in the same hive some bees will be dying of it when long confined, and the greatest part of the hive nothing the worse. But why all this perplexity, thinks I, about some bees being diseased; while others beside them are healthy? is it not apparent to common observation, that the same is the case among mankind? when a disease is in a land, in some cities death rides triumphant, while others scarcely feel the calamity. In some families, the small-pox blasts perhaps all the hopeful plants, while others escape with scarcely a scar from the awful foe. Thinks I, no doubt, there are some bees of a more delicate and tender constitution than others, and these become an easy prey to the contagion, while others of a more robust, strong, and healthy body, bid defiance to the disease.

Upon the whole, confinement seems to me to be the alone cause of the said purging, and flying out in fine days the specific cure: but seeing we cannot prevent bad weather from confining them, and thereby bringing the diseases on some hives, neither can we procure good weather to remove it. I freely own, I neither can prevent bees from taking diseases, nor can I cure them when diseased; but I, at the same time, profess, that I can prevent a great many evils that bee-hives are apt to fall into by imprudent management of them; and also that when a
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bee-hive takes a dis-thriving, I can make her thrive again.

The reader need not be discouraged because he cannot cure his purging bees, for notwithstanding all that has been said, it is not one of a dozen of hives that is much the worse of it one year with another; and of those that have it let him remove the dead that falls down on the board, and if many die, strengthen the hive with more bees.

Before I leave this, I cannot but observe, that I never knew the Queen a sufferer by a looseness, I suppose it is because of her being always in the warmest part of the hive, and in the midst of the bees.

It is certain that if a hive be kept in an out-house close shut up (so as to admit only air, but not to let a single bee out of her) during the five coldest months, they will often do very well next spring. In such a case, no doubt, they must ease their bodies in the hives on their boards, but I believe sore against their will, yet they must submit to necessity, seeing they can do no better.

If some of your hives be reduced of bees in winter, and you wish that they had more bees, and that they would breed fast, then you may give a strong hive 1 lb. of liquid honey, (which I call a reviving) by pouring it among the combs; which when doing, hold the hive a little to one side, and by pouring in the thin honey, it will run into the empty cells: the bees will be very fond of it, and it will so revive and rouse them, that they will fall a hatching immediately (having many bees to increase heat): and af-

ter twenty days or so that they are hatched out of the cells, take a good many common bees from her, as directed page 81, and re-inforce a weak hive with them, as directed page 83, &c. Perhaps the reader may think, better feed the weak hive, and thereby rouse and revive her, and make her fall a hatching forward bees for herself, which would prevent the trouble of re-inforcing. No, that is not such a good method, because few bees in a hive in winter have not sufficient heat to hatch out young bees with; and even in spring few bees in a hive can scarce bring forward any young for want of heat; in the middle of summer itself, few bees in a hive increase very slowly; for which reasons, among others, I have been so keen of advising you to keep your hives always well-stored of Bees.

By the foregoing method I have made my bees breed fast in winter, and early in the spring, when they were no more thinking of breeding, than of swarming.

In winter, bees may be found on the floor of the hive, that have died merely of old age, for as they enter the stage of life at different periods of the spring and summer, they consequently depart from it also in all the various seasons of the year.

When a hive has been long confined by unactive weather, and a fine day comes in the beginning of *February*, I have carried her to the warmest and quietest place I could get, generally some pleasant green, upon which the sun shone, and turned her up about 11 o'clock, and set her down on a pair of sheets, with the combs opposite to the sun; and the sun shining down
between

Between the combs among the bees, roused them so, that they would come out of the hive, and fly about, and play, and air themselves, and ease their bodies on the sheets and all around, and make it all brown spots, and I have poured a little liquid honey among the combs, which would have cheared their hearts, and made them very happy, and also fit for a while more confinement: and they, to reward my generosity, at night, in the hive, would give me a cheerful song, and perhaps were concerting measures to hatch me forward a new progeny.

The reason I set the crown of the hive on a pair of sheets is, that the weakly bees might rise the better from it.

After the bees are all got into the hive again, they are to be set in their own stance, and not to be suffered to get out for other ten days, lest they should fly to the place they were turned up at, and some of them be lost.

No doubt, the reader will be ready to say, better turn her up at her own stance, and thereby prevent the trouble of removing her; and also the bees may get out next good day without any hazard of being lost at another place. Yes, the reasoning is very just, and must always be done where they stand, provided it be a tolerable good stance; but in case it be a cold or very wet stance, many of the bees would perish by lighting on the ground around them. The other I oft prefer, because I can get almost any part to set them in for a single day.

Bees, after long confinement in winter, perhaps eight weeks, forget where they stood, and must take as new an observation of their situa-

tion as if they were perfect strangers in that place; for which reason, if I want to remove a hive, I often do it after long confinement.

Care should be taken during winter that no mice nestle about the coverings of the hives, and if they do, they should be dislodged: but indeed the only hurt sustained by mice is when the entry is left so large, as they can get in at it, [the reader will remember I gave directions in page 79, to make their entries so little as a mouse could not get in] for I seldom ever see a mouse gnaw a hole through the hive to get in at. If they lodge in the covering, I suppose it is for heat; however it is good to be sure, therefore dislodge them, for mice are most pernicious enemies when they get into a hive, they destroy the combs, eat the honey and bees, and often ruin hundreds of hives in *Britain*, every winter. I have, in my younger years, suffered greatly by these invaders: one winter I lost five hives by mice; but for many years since I have not lost a single shilling by the whole fraternity of them, merely by keeping little entries. In the cold months, snails often creep in at the entries of the hives, and lurk about the insides of them, generally upon the hive, but not among the combs: I never saw them do scarce any hurt. When the hive is turned up in winter to know her state, they are easily dislodged, and large ones cannot get in when the entry is little.

C H A P. XIV.
OF CANDIED HONEY.

SUNDRY writers affirm candied honey to be very destructive to Bees. Mr. *William White* says, you may as well give them poison as give them candied honey. Mr. *Thomas Wildman* says *, ‘a sudden return of cold congeals or candies the honey in the open cells. On the return of warm weather the Bees return to the cells they had opened, and finding there a substance which is too solid to pass into their stomachs, or which they cannot swallow, they throw it out of the cells in search of good honey. The candied honey falls upon the stool or bottom of the hive, and by this means they make their own graves.’ This is a great mistake, that candied honey becomes the graves of Bees on their stools; for such candied honey as they throw out of their cells is of a hard substance resembling small hail, but harder, and will break, but not in the least tenacious, neither does it stick to the Bees as mentioned by him in page 242, where it is said, ‘the Bees could not stir without daubing themselves with it, and by their endeavouring to
‘red

* Page 243.

‘red one another of it, they daubed each other
‘more. Their bodies were besmeared with it,
‘and their wings so loaded that they could not
‘fly.’

I never saw any such thing as honey that Bees throw out of their cells stick to them, they carry it out of their hives with their mouths; and it is sometimes on or before their entries, like salt or hail: the strongest hives carry it out, and I have seen all hives in spring throw it out.

The only loss by candied honey is, it is for no more use to Bees, for they cannot eat it; but that it worries or daubs them, I deny; in case a comb in a hive be full of candied honey it is all lost, for the Bees throw it all away, and no use can be got of it, unless the owner was to take it out and melt it on the fire in a pan, and squeeze it out and then feed his Bees with it; but I never do that, but let them make the best use of it they can.

The only way to sustain no loss by candied honey, is to keep good stalls that are full of Bees, which will keep the hive warm, and cover them well, and make them little entries, which is all you can do to prevent its candying.

C H A P. XV.

THE HISTORY OF AN UNCAUTIOUS MAN'S BEES.

IT is generally observed, and there is too much truth in it, that Bees thrive best with people for two or three years after they get them at the first. The way this happens is thus, when a person buys a stall at the first, she is generally a good one, is 30 lb. wt. has plenty Bees and honey; then if next Summer be good, she will probably swarm twice, and then he asks his neighbour's advice, and he advises him to kill the second swarm, and keep the first and her mother, which are good stalls, and bid defiance to the three capital enemies, *viz.* cold, robbers, and famine.

The second summer being good, they both swarm twice again, and the owner thinks he is a thriving Bee-master, (as so he is.) He again, with his neighbour's advice, kills both the casts or second swarms, and still keeps the two old hives and their first-born, which makes four good stalls. Again the third year is but a middling good summer, often cold and rainy: however as his stalls were good, two of them swarmed once, and the other two twice, in harvest he again kills both his two second swarms as usual, and begins to think now he knows as much about Bees as any man, and
asks

asks no more his neighbour's advice how to set aside his stalls; and thinks, that as he always kept the mothers and their first swarms, and they did well; therefore he sets aside the four old hives and their top swarms, which make eight stalls*. Now his counting faculty begins to operate, and he assures himself of twenty hives next year; but alas! how is he perplexed when he thinks his bees increasing so fast, his yard will soon not hold them! ready-wit, his bosom friend, relieves his agitated spirits, by informing him that it is only to make his garden larger. Now he is at great pains to get his bees covered and made fit for winter, and lets them stand in hopes of a good increase next summer, and falls too to make sixteen empty hives, and as many boards to receive his next year's swarms.

A fine day about *Martinmas* causes the owner to take his friend along with him to see his flourishing garden full of bees, where he entertains him with a lecture on the profit of those useful insects; he goes by two or three of his hives, and they are flying smartly out and in, which pleases him well. The next he comes to is not so brisk, he may stand before her entry without being the least injured by her stings; he excuses her laziness, by informing his friend that

* The summer being bad, they had not time to gather enough of provision for the winter; only two of the old hives and one top swarm, were thirty pound ones, of the rest, none had honey enough for winter; other some were scarce of Bees also, and not one of them should have been kept for stalls.

that they do not come out of the hive all alike at the same time: however to satisfy him that she is a good hive, he raps on her side to let him hear her sound, but as ill luck would have it, she will not answer that summons: he turns her up, changes colour, and says, surprising! she has not a Bee in her, but some honey at the top of the hive *. What has happened her? says he; tells all his neighbours the astonishing news, turns a little more pensive about the profit of Bees: however he has still seven, he wishes they may stand the winter and spring; a cold storm comes on, and lasts eight or ten weeks, after which fine weather again, the Bees go an airing, and the good-man comes to see how they come on now. Passing by some of them, he is pleased to see how throng they fly about, and rain away their ordure from them, as appears on every thing that is white. He sees one at some distance, not so throng, as he could wish, runs to her, fears the worst, raps the hive, out jumps a mouse at her entry, (which was rather large) turns her up, dead Bees half eaten, and a good many shorn combs on her board, a great many Bees sitting very close (rather over) betwixt her combs. The peaceable Bees never offer to fly at his face, he can view them as he pleases, and never receive a single sting;

* She was an old hive that swarmed twice, and was only fourteen lb. wt. and had but few Bees in her, and should not been kept. Her Queen died perhaps when there was not an egg in the hive to raise another of, therefore the Bees left it.

sting; he concludes she is dead *, gives over making empty hives.

He has still six, says, I wish they may not all die; in *March* four of his hives carry loads hard, the other two is as busy, but not carrying so fast; a Bee loaded in half an hour is a good deal for them, however the entries have full as many Bees about them, and rather to the rather, and far more dead ones, and many gallant soldier crawling about in his wounds before the gates of the hives. The owner thinks some man's Bees are for robbing mine, but they had better stay at home, says he, for my Bees kill them fast. In a day or two after, at night, the good-man goes to hear how his Bees sound; the four carriers please him well by giving him a good song, the other two are not so loud; he claps their sides to make them speak better out; they turn sulky on him, and obstinately refuse to answer, he grips at them to feel their weight, but by pulling them up too hastily, he almost falls backward, by their coming too quickly from the board; when recovered, he is startled again to see other two of his hives full of nothing but deaf combs which the robbers had left †: he throws them from him as useless, and the

* She had far too few Bees in her to stand a cold winter, besides she was only an 18 pound one, and had the rogue Cold spared her, Mr. Robber and Famine would asked where she lived, the filthy Mouse asked his tithe, which the kind owner obliged him with, by keeping open to him a large door, which assisted him and Cold greatly to ruin the hive.

† These two hives had few Bees, and were not able to resist robbers, which if they had escaped them, they

the fall breaks all their combs †. When come to himself again, he says, I have still four yet, and am richer than when I began: the four carry briskly all *April*, and he thinks all danger is past now; but alas! eight days misty weather in *May* keep his Bees all close prisoners in their hives: a fine day returns again, and three of his Bee-hives fall to work heartily, as if they meant to hurry home all the honey in the neighbouring flowers, before another rainy day comes; the other is not so careful, she appears as if she did not value a good day much; not a Bee to be seen about her gates, except here and there one something like dead. The owner begins to quake again, says it is not possible she can be dead after carrying so much, is afraid to lift her from her board, must do it, she is motionless, and the board covered with dead bees, and her combs full of dead young §. O foolish man! why did not you ask your honest neighbour's advice, who would advised you to kill all

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they would have had a good luck if they had missed Mr. Famine too in *April* or *May*; they should by no means been kept for stalls in harvest, having neither enough of Bees nor honey.

† Had the frightened man not been so quick in his nature, and preserved those two hives; and them that died formerly, they would been very profitable to put swarms in next summer.

§ This one was a 24 pound one, and had she missed that blast would have done very well; or had the good man given her 4 lb. of honey-combs in *April*, he might have saved a hive which would probably have made him other 30 lb. to it.

the five hives that was light and scant of bees, which at harvest, one with another, was worth fifty shillings, but now is scarcely worth eight altogether; besides all the vexed hearts you have got with them: be sure never to do the like again if you be wise, rather kill all your light hives, and purchase heavy ones with their cash, suppose it should take the price of two of your weak hives to purchase a strong one; you will have more profit, and fewer to laugh at you in the end. Would people keep never any but thirty pound ones, their bees would thrive as well all along as at the first. I have given the above history to deter others from taking the same steps, which this imprudent man did.

C H A P. XVI.

OF FEEDING BEES, OR THE BEE-MASTER'S LAST SHIFT.

FEEDING bees I greatly dissuade from, unless you have been so foolish as to keep weak stalls in harvest, then feeding may be sometimes necessary in spring; and when new swarms are confined in bad weather, it is thrift to give them a meal, and in case you are obliged to feed a hive in harvest for a stall, when none of your own will do, by reason of a bad summer, nor can you get any thirty pound ones to buy, then you will be obliged to feed.

If

If in harvest you have not as many thirty pound ones of your own as you want of stalls, then go through the country, and try to purchase as many of those kind as you want for stalls: but in case the season has been so very bad (which rarely happens) that you neither can have as many of your own, nor get as many as you need of good stalls, then you must feed in that case, and I cheerfully give directions to do it, when you cannot do better, only let feeding be your last shift. Supposing you to want a stall, and have not one 30 lb. wt. but has three or four hives 20 or 24 lb. wt. ; then take one of the best of them that is nearest 30 lb. wt. and also take as many of honey-combs, and put to her, as will make 30 lb. wt. and so fit for a stall. The way to do it is this, take a board and set an eek (as wide as the hive) on it, having an entry in the eek ; it should be four or five rows deep ; then take honey-combs, and cut them longwise so as to reach from one side of the eek to the other ; if you have any that large, and as deep, as when you set on the light hive, the under side of her combs will touch the upper edge of the combs in the eek. All the combs in the eek must be placed in the same order they were in naturally in the hive they came from ; I mean the cells that was uppermost to be so still, and an inch and half from one comb to another, and fix them with sticks the best way you can, so as to make them stand on their edges. Then at sun-set lift up the light hive, and set her on the eek, the combs of them to run in the same direction as near as can be done, then she will be 30 lb. wt. and a good

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stall, seeing you could not do better, for the bees will soon fix comb to comb, and make them to lift all at once. Very readily they will carry the honey all up to the upper story, after which you may take a knife, and cut away all the combs again if you please, or do it with a piece pack-thread, by making it pass between the eek and hive, holding one end in each hand, and drawing it back and forward, as in the manner of drawing a saw; it will soon cut the joinings, and then set down your hive as before. But sometimes the Bees think the honey is as well placed in the combs you give them, as they can place it, at least they can put up with it in that manner, and will let it stay there till they gradually eat it out; but whenever done, take away the eek, and let them have only combs of their own building, for were so many empty combs left, it might retard their swarming next year; but if the hive was rather little, you may let them stay, which was the reason I was so particular in ordering how they should be placed: but a prudent Bee-master will easily consider what is most fit for to be done in this and many other cases, which may happen in the management of bees, which no writer can foresee. The reader will be ready to say, this is a fine way of feeding, for it does not tempt robbers by the smell of fresh honey, as it has the same smell of other honey-combs in their own hives; besides it is done at once, and no bees are drowned, as too often is the case in the plate way of feeding bees; neither is it a continued toil, by giving it every day, as Mr. *Keys* directs, nor need the bees surfeit themselves by it,

it, as they have it in combs, and are sure it is all their own: but he will be ready to ask, how am I to come by these combs? this is no difficulty, for if you kill any hives of your own in *September*, you will get their combs; but if you kill none, then purchase them from others that have them; and you must feed the same way in spring, if you have been so foolish as to need to feed in spring: and give a top swarm also a piece of honey-comb when she needs it, when she is new swarmed, and that is the far best way of feeding bees, therefore take this method by honey-combs. In this way you may make any hive a heavy hive at any time. I would advise a bee-master to keep always a large quantity of honey-combs by him in a large jar to supply any emergent occasion; all old honey-combs, and all those that may be mixed with much bee-bread, and young bees in them in taking time, should be given to bees to take the honey out of them, as it would be for little use otherwise, and the bees will make good honey of it. The way to give them it is this, take a large eek made on purpose, eight rows deep, and place it on a board, and place the said old combs in it, in such a manner as the bees will get to all edges of them, and then set on a hive well stored of bees and lightest of honey, and they will soon make merry with it, and you may remove the combs and eek in two or three days, and you will find them honeyless.

But in case you need to feed bees, and have no honey-combs to feed them with, then you must take the next best method, and that is to feed the plate way with liquid honey.

Supposing you to have, in *March* a weak hive that must be fed, then give her a supply of food in this manner:—take 2 lb. of honey and put in a pan, and put also a *Scotch* gill of water among it, and warm it in the pan till it be all well melted and mixed together, (so as they may lodge it conveniently in their cells) then pour it in a plate that will hold it conveniently, then take a strong sheet of brown paper, and pierce it full of small holes, and cover the honey with it, and have a board made on purpose with a hollow cut out in the middle, so large as to contain the plate with the honey, that when the plate and honey is in it, the upper edges of the plate may flush with the board, and thereby not bruise any of the combs of the hive when put over it: having your board, plate, and honey all ready, then at sun-set go to your weak hive, and set down your feeding board beside her: then lift gently the hive, and place over the honey, and the bees finding the smell, will come down and carry up the honey, and lodge it in their magazines for further use. The next morning, perhaps, if there were many bees in the hive, the plate will be honeyless. And you may set the hive on her own board again; but if she had but few bees in her, give her honey in proportion to her number. Sometimes a cold night will not suffer the bees to carry up much of the honey: in such a case, next morning shut them close up, round and round, so as not a single bee may get out, and let them stand so for two days, and they will in that time have carried up the honey. When a hive is feeding, never let any strange Bee into her, for

would bring multitudes, and make much laughter and mischief; which makes me so positive in ordering you to feed with honey-combs. In case you have neither honey-combs nor honey to feed with, you may give them a little sugar and water mixed together, and feed them the same way you do with the honey in the plate and board, only they must have less at a time, and be constantly fed; whereas in feeding with honey in the plate way you should give them as much at a time as will serve them twenty days. Great care should be taken in all your feeding of bees, to give it so as to prevent their falling out about it; therefore never feed in the day-time, unless your weak hive be not within half a mile of any other hive.

I cannot pass this subject without animadverting a little on *Keys* directions for feeding bees: he is at a great deal of pains (page 310) to prove that ale and sugar will preserve Bees from famine:—all true—who denies it? He is for feeding Bees in small kexes, and proposes to give a hive a full one every twenty-four hours; but in case they do not eat it out, to give them less next time, that there may be no danger of their overcharging themselves. Some stickler may perhaps say—Seeing he says they eat to excess, why might not a hive which he had given a kex to, eat to excess, and thereby return him his empty kex, which would delude him still, that one full kex was little enough for that hive, and he would always give them kex after kex, as long as they eat them out, although it might be to their ruin, as he says, (page 306.)

‘ Bees

‘ Bees are like some other creatures of a more noble species, who not contented with a temperate enjoyment of abundance, feed to excess, and thereby lay a sure foundation for numberless diseases, often terminating in an untimely and painful death.’

If Mr. *Keys* means to give a Bee an exact meal, and no more, he must first ascertain how much weight or measure of sugar or honey refreshes a Bee at a time; and next count the exact number of the Bees in the hive he intends to feed; then he must weigh or measure as much food as will feed a single Bee, and give that Bee its livery in some curious instrument, and so give every one their exact proportion by themselves. Perhaps the aforesaid scrupulous person may still urge and say, This would be a very troublesome business. But Mr. *Keys* has an answer at hand, p. 311. He says, ‘ So is feeding poultry and pigs; let the farmer’s wife refrain from it three or four days, and see how fat they will be.’ If the scrupulous man still will be obstinate, he may say, that the Practical Bee-master* says, page 162. when criticising *Thomas Wildman*, for uniting two hives, which may be done at once, never to be repeated more, ‘ this method requires too much leisure and patience to be generally followed.’ And he may also pretend that the Practical Bee-master and Mr. *Keys* are quite different in their doctrines on that head, namely the Bee-master is so afraid of trouble, that he will not unite a hive,

* Practical Bee-master, by *John Keys*.

hive, (tho' greatly profitable) altho' it is done at once; whereas Mr. *Keys* is keen for feeding Bees daily let it be never so troublesome.

The truth is, give a hive never so small a quantity of food to eat at a time, the Bees that get first at it will have a belly-full, and the most part of the hive never touch it. Besides feeding Bees daily is a daily trouble, and daily brings robbers to plague the hive and kill some of her Bees; whereas giving Bees as many honey-combs at a time in harvest, winter, or spring, is doing your business well for once, never to trouble you more. Mr. *Keys* has another most curious way of feeding Bees, which he calls public feeding, and that is to put honey in a board full of holes, and set it out in the apiary, and let your whole Bees at it. This is a new fashion indeed, but I hope few will follow it, unless they want a general massacre among their Bees: for whenever Bees can get honey in any other thing than flowers, (I mean out of their own hives) they directly fall out about it, and much fighting and slaughter ensues. It is true indeed, I have sometimes fed them that public way, but for the most part to my loss; and cannot recommend it as practicable.

Directions will be given to know when they must be fed, at the different seasons, as we go through them.

But I am weary of writing on so disagreeable a subject, and hope my wise readers will take advice, and keep good stalls in *September*, and thereby scarcely ever need to seek directions in this chapter, called, THE BEE-MASTER'S-LAST

SHIFT.

SHIFT. And I conclude this chapter with asserting, that he is a wise man who keeps good stalls, and thereby needs not to feed his Bees.

C H A P. XVII.

OF THE WARS AND ROBBERIES OF BEES; WITH
DIRECTIONS HOW TO PREVENT THEM FROM
BEING ROBBED.

ALL Bees have a martial spirit, and strive to enrich themselves at the expence and ruin of their neighbours; for when the weather is good, and no flowers in the fields for the Bees to work on, they will venture their lives, and rob for it; and then the hives that have few Bees in them are to be pitied, for not a hive in their reach is left unassaulted, and, as among men, the weakest goes to the wall; for strong hives, when attacked by robbers, give them a terrible reception, and scarcely one that they get hold of gets off to tell their neighbours tidings. And the siege laid against a strong hive is soon raised, and the hive nothing the worse, perhaps scarcely loses a score of Bees when the wars are ended.

Various reasons have been assigned for their going a robbing one another: the bulk of writers impute it,

1st. To

st. To a hive in harvest not having a sufficient provision of honey in herself for the winter; she therefore tries to enrich herself, to the ruin of her neighbour.

ed. Dr. *Warder* assigns another cause of their fighting, which is the necessity that the Bees are reduced to when their own hive has been plundered at a season when it is too late for them to repair the loss by any industry of their own in the fields.

gd. But their fighting and plundering ought chiefly to be imputed to their insatiable and ardent thirst for honey; for in spring or autumn, when the weather is fine, but no honey can be collected from plants, and is to be found only in the hives of other Bees, they will venture their lives to get it there. I believe the poorest are keenest of robbing: but in such weather as was mentioned all hives go a robbing, whether rich or poor.

4th. Another reason of their robbing is when there is a large quantity of Bee-hives in one place; for every hive tries the strength of all the hives in its neighbourhood, and they all go a robbing who to rob fastest; whereas four or six hives only standing in one place, are soon tried, and they find out one another's strength, and make no further assaults, which was the alone reason I advised to set hives thin.

5th. But

5th. But one great reason which provokes Bees to rob is, when hives are fed ; for the robbers smell the fresh honey, and come for a share of it, and will not take a refusal, tho' it should cost them their lives, as every one may know that has done it (in an imprudent manner): the robbers coming often for a share of the supplied honey, and finding that there is honey in the combs, ascend them also, and claim an equal right to both, which often makes the cure worse than the disease: which is a strong argument against keeping light hives for stalls.

If a hive that has not many Bees in her is attacked, she sometimes will resist to her power ; and you will perhaps see four or six brace of warriors before the entry wrestling in a most furious manner, twisting each other round and round, and striving for victory : if the robber can get clear from the native, it is generally what it wants ; but often one of them is slain by the other thrusting his spear into the most vulnerable part of the body ; and sometimes the Bee leaves the sting in the wounded, which becomes fatal to both. But in case the robbers find they gain some advantage over the natives, then they come in great multitudes, and pour in their forces at the gates of the city, and rush into the remotest rooms, and tear open the cells, and carry off the richest treasure ; and if the native Queen be slain in the engagement, it is thought the Bees join the robbers, and unite with them, and so carry off their own spoil.

The

The robbing time is sooner or later according as the spring or autumn is more or less favourable; but it is generally twice a year in the spring and harvest. The most of writers say, that there is more hurt by robbing in autumn than spring. I cannot say with respect to those who live in very early parts, when the flowers is soon blown, and soon over; the flowers coming in soon in spring, afford the Bees work, and consequently keeps them peaceable among their neighbours; but when they are soon gone, and the weather still good, it provokes them to plunder. But experience teaches me, that I suffer far more by robbers in spring than autumn, for I never yet had a single hive suffer much in autumn by robbers; whereas in spring I have had (in my unexperienced years) a good many robbed out root and branch.

The way I account for it is this—in spring there are far fewer Bees in a hive, than in autumn, and so are not so able to defend their property, as they are in autumn, when they are far more in numbers.

Also in spring their honey is near done, perhaps quite exhausted, which necessitates them to filch about for it wherever they think they can find it: but in autumn, although they may not have a sufficiency for winter, they have present supply, therefore present necessity doth not force them to such an unlawful shift.

Sometimes many hives will go a robbing another hive, and then all is confusion; and rage and great slaughter takes place: they will be flying like so many fiery dragons, ready to at-

M

tack

tack every one; and whoever dares obstruct their flight, shall feel their poisonous spears in a moment. In such an unhappy time one dare scarcely go near them, unless he is resolved to receive wounds from all quarters. When they are engaged thus, their sound in the air is easily known.

*The people's actions will their thoughts declare,
All their hearts tremble, and beat thick for
war;*

*Hoarse broken sounds, like trumpets harsh a-
larms,*

*Run thro' the hive, and call them forth to
arms;*

*All in a hurry spread their shiv'ring wings,
And fit their claws, and point their angry
stings;*

*In crouds before the hive they all do light,
And boldly challenge out the foe to fight.*

We shall first shew the signs by which you may know when a hive is attacked and suffering by robbers, and then how to preserve her from them.

You will perceive Bees going out and in to the hive that is receiving the injury, early before other Bees are fallen to work, and at even, when other Bees have given over working, they will also be doing the same at the hive that is committing the robbery, which you may perceive, if she be near you; for these plunderers find this the best time for their

their purpose, because they meet with the least resistance.

The first time of the year that Bees get flown about, and scarcely any flowers in the fields, is the time they go most fiercely a robbing; but if they meet with strong hives ready to engage them in battle-array, the wars are generally ended in two or three days. I have seen them about the middle of *March*, in fine weather, rob so violently for two days, in so much that I have thought by their appearance they were determined to root every hive out within their reach: but by the weather changing to cold or rainy, or both, kept them in their hives for eight or ten days, by which time the flowers were springing fast, and the weather changing again, and permitting them to go out, they would never have remembered their former wars, but would have fallen throngly to work, and therefore robbed no more that spring. Again, I have seen in early springs, when the flowers were as soon blown as the Bees could go out of their hives in search of food, and finding materials to work on among the flowers, they would not have robbed any that season—a happy circumstance for the Bee-master.

Whenever any of the signs of a hive's suffering by robbers is observed, an end should be immediately put to their wars; or, which is better, their robbing should be prevented before the wars begin: therefore I shall first inform you how to prevent any hive from becoming a

prey to robbers, and next shew how to terminate their wars when engaged in them.

It is the want of a sufficient number of Bees in a hive to defend her that is the alone cause of her becoming a prey to robbers, as I have told you already in page 77, that a strong hive of Bees never suffers much by robbers; therefore in the end of *February*, or beginning of *March*, turn up every one of your hives in a cold morning, and you will discern at one view (by looking down between the combs) the hives that have plenty of Bees in them from those that have few; and if you should have three hives that are well stored of Bees, and one that has few, then take a thousand Bees from every one of the three hives, as directed p. 81, 82. and put to the weak one, as directed p. 83, which will make her fit to repel any daring foe; and the strong hives will be little worse of the loss of a thousand Bees: I often take as many Bees from one single strong hive as is sufficient to strengthen a weak one with. The reinforced hive being now made up of different Bees, if left standing still in her old stance, some few of the new-comers are ready to fly to their mother hive again the next fine day; therefore to prevent it, I often remove the reinforced hive a mile or so from where she stood, and lets her stand there for two or three months, which thins my own apiary of Bees, which is another preservative from robbers; for the more hives standing in one place, the more Bees are yearly killed by robbers.

But

But in case you have a hive that has few Bees, yet dare not venture to reinforce her, (and indeed you must not be too venturesome till you can handle Bees middling well, lest you make the cure worse than the disease) then remove her (weak as she is) a mile from any other hive, and she will do very well, standing herself alone, and none to disturb her; whereas if she be left in the midst of ten or twenty hives in the fierce robbing time, ten to one if she continue long a living hive.

I have oft had the greatest satisfaction imaginable in removing weak hives out from among many others in robbing time. I have seen a weak hive beset day after day with robbers, and resist them to her power, but having few Bees to fight, and carry on the work, and keep heat in the hive, and some being killed daily in battle, would, instead of increasing, as they should in *March* or *April*, rather decline; and if they were not killed quite out, they never did much more good; whereas when I have seen a weak hive attacked in that manner, I have directly removed her a mile from any other Bees, and she would have been very happy to find, that instead of war and rage, peace and harmony was restored; and the very first day she was set down, she would set about reforming whatever was disordered in the hive, by burying all the dead that were slain in battle during the war, and mending every ragged comb and breach about the hive, and would have begun to work, and wrought peaceably and keenly according to their numbers, and come forward to have been a strong hive in *June*, and

M 3 sometimes

sometimes swarmed, which was all won money, for if she had stood in the midst of her enemies, she would have either been killed outright, or worth very little at harvest.

The most of writers direct when Bees are suffering by robbers, to make their entries so little as one or two Bees can only pass out or in at a time, alledging that the native Bees are thereby able to defend so small a gate, and thereby resist the robbers; but if, say they, notwithstanding the reduced entrance, the war is not ended, then shut up the entry of the hive that is receiving the injury, so as not a Bee may pass out or in, and let her stand so for two or three days, by which the robbers coming day by day, and not finding admittance, they will give over further attempts, and you may again open the ports as soon as the coast is clear of pirates. For my part, I never saw much advantage by these methods: the native Bees cannot bear confinement long when the weather is good, and whenever the entries are again opened, generally the robbers renew their attacks. At best it is very troublesome, and seldom gives much satisfaction; but reinforcing and removing in spring is an effectual cure, and done at once. In autumn all hives that are troubled much with robbers, it is a sign they have but few Bees; therefore take them immediately for your use, for your right is better than the robbers is; and I never mean to direct to keep a stall that has any defect in her, in order to be cured, and teach how to cure her. I only mean to instruct how to mend a hive that has taken some dis-thriving in your hand at a season of
the

the year when if you kill her, she would be of little value.

In spring all methods should be taken to mend weak hives of whatever diseases they may be labouring under, as the honey harvest is at hand, and they being properly cured, will requite the owner by their further labours. But in autumn a weak hive (of whatever kind) should be immediately taken; for the longer she stands the worse will she turn, and all mending of weak hives then is doing what you can to lose both what honey you give them, and also all they have of their own, besides all your trouble; therefore I give no directions how to save weak hives from robbers in autumn, but only this one, and that is, remove their Bees by death, and their honey into your warehouse; which is the alone cure I prescribe at this season of the year. But to return to the spring, strong hives are very seldom attacked, and when attacked suffer little or nothing by robbers; which is one strong reason, among many others, for keeping none in *September* for stalls but what are so.

I shall here quote a revery from the Practical Bee-master, where the reader will see a perfectly new scheme to preserve Bees from robbers: 'When a stock is beset day after day,' says our author *, 'it is a sign that the robbers have 'tasted deep of the nectar; in this case it will 'be best to take it, if light, and to drive the 'Bees, and unite them to another hive; but if
'weighty,

‘weighty, let it stand, and kill the robbers: if
‘they are not killed all in one day, two or three
‘days may be taken, keeping the Bees stopped
‘up all the while; but it will be best to finish
‘them, if possible, in one day, lest in revenge
‘for their disappointment, they should fall upon
‘some of your other stocks:—a good method
‘to prevent it is to irritate all your other stocks,
‘by thrusting a twig into each of their hives.’

I hope I need scarcely to point out to the most of my readers the absurdity of such preposterous, wild, and extravagant directions: every one at first glance may see the direful consequences of such a pernicious practice. If Mr. *Keys* means the destruction of all robbing Bees, his business may be done at once by smoaking every hive in his reach, without giving himself the trouble of killing and slaughtering day by day; for it is certain that all Bees go a robbing in good weather, when they can get no flowers in the fields to work on: and if in such weather one should view his Bees, he will see strange Bees robbing at every hive; and if he were to have six hives, and appoint six men to kill every strange Bee that attempted to go in at their entries, he might kill on as long as there were Bees in the neighbourhood; and his neighbour taking the same method, it would be kill who to kill fastest, and next to rooting Bees out of the land:—for instance, were 20 hives in one apiary, every one of them would try to rob another; and were you to kill the one half of the Bees, the rest would let you see they did not value you, but would rob on still; and should you still think, I will
kill

kill 16 of the hives to save the other four, the remaining few would still try to rob each other.

Mr. *William White* speaks to better purpose, when he says *, ‘ If there are several stocks of Bees in a garden, and one of them goes a robbing, when the rest hear the conquering sound, they will immediately join the victors with all their strength and might.’

‘ Sometime ago I went a few miles to visit a relation, and stayed a few days. Returning home, before I got to my house, I perceived there was mischief broke out among my bees, and upon going into my garden, I soon perceived the matter, which was as follows :’

‘ One of my neighbours had five stocks, and nine of mine joined with them, and had killed four stocks out of the five, which I was very sorry to see, as I could have prevented it if I had been at home by using proper methods.— I was acquainted with a neighbour that had a stock robbed, and falling in a passion on the account, he threatened to kill all the robbers, be it as it would ; so he stopped them quite up, (the hive that was receiving the injury) ‘ and made a fire before the hive, by which improper method numbers of poor industrious creatures perished in the flames, which was a barbarous action ; for he not only killed the robbers, but also a great number of his own bees, for he had several other stocks ; but this may be imputed to nothing but want of judgment, ‘ as

‘ as it might have been remedied by a much better method than so cruel a one, as the putting
 ‘ such a number of industrious useful creatures
 ‘ to a grievous death, for there is not one action
 ‘ of their lives, but tends to the manifest benefit
 ‘ of mankind.’

By keeping very little entries in robbing time, prevents the robbers from going so easily into the hives, as a small force will defend a narrow passage against the power of a great army. But I conclude here with again repeating the grand cure, which is, either reinforce or remove the attacked hive, but rather do both to her (if you conveniently can) as soon as you see she needs; and I assure you satisfaction by those methods, but cannot promise you success in any other way.

C H A P. XVIII.

AN UNCOMMON DISASTER, WHICH SOMETIMES,
 THOUGH RARELY, HAPPENS BEES.

I SHALL here narrate a very strange disaster which happened to four of my hives last spring; which, for the singularity of it, I hope the reader will excuse me for relating here.

In the latter end of *March* I had four hives that had but very few Bees in them, and also very little honey, and consequently could neither have defended themselves from robbers nor
 famine.

famine. To put them in a way of defence from both, I supplied every hive with a sufficiency of honey to bring her to *June*, and also after two days reinforced her with Bees to defend her from robbers; after, in the first week of *April*, I took the four hives a mile from my own apiary, and placed them in a sunny quiet place among whins, which were beginning to bloom, and near some fallow trees whose palms were out, so that when the weather was fine, they had food at their door without the trouble of much travel. At the same time I set other four good hives beside them, which had plenty of both honey and Bees of their own, and thereby needed none of my assistance (happy hives are such!) As soon as they were well set down among the whins, the weather turned very good, and my four mended hives fell briskly to work, and wrought throng for twelve days of fine weather. The other four good hives began to work too, but wrought in a more slow manner; for, for one loaded bee that went into the good hives, there went three into the mended ones; I supposed they were in a manner extremely happy to find their case all on a sudden so agreeably changed, *viz.* from poverty to plenty, from a few bees that could neither keep heat to hatch with, nor defend from robbers, to a numerous hive which could answer both ends, and also being placed among plenty flowers to work on, while bright *Phæbus* failed not to complete their happiness by shining pleasantly to invite them out: they wrought throng for twelve days as I said, and I turned every one of them up to see how they were breeding, and I was as happy

happy as them to see they were hatching forward a numerous young brood in the cells; each hive had more than a thousand sealed up cells in her, while the strong hives had not above the one half of that number: thus they went on in this prosperous manner during the said good weather; then the weather set in very bad and cold for other eight days, insomuch that when I was carrying one hive, my hands turned so cold that I could not hold her.

Good and pleasant weather comes round again, and my strong hives fell briskly to work; while scarcely a bee was to be seen at the entry of any of my mended hives: I was surpris'd at it, as knowing it was neither for want of bees nor honey; I then turned them up, and by looking down between the combs, I saw plainly that the young were all going backward in the cells. I waited other eight days, and none of the bees ever carried any at all, while my strong ones carried throng. I then turned them up again, and cut out a large piece of comb with maggots in it, and found every one of them dead, and going backward in the cells: as it was such a case as I was perfectly a stranger to, I could not know the cause how it happened; neither did I presently know what method to take with them next. I conjectured that every hive having got so many bees, and so much honey added to them; at the same time placed in the midst of good pasture, to which the sun added his comfortable presence, all which completed their happiness, and set them a thinking summer was at hand, and now they should set to prepare for it, by hatching forward

forward a numerous brood, which they accordingly had done, and had a vast number in their cells, considering the season of the year, and the short time they had; and also their number was not very great, although they had a moderate quantity. I also conjectured that as the Queen had been made prolific by the heat in the hive, to lay great quantities of eggs, the bees had also to go off in large quantities foraging among the flowers for fresh farina to seal the maggots up in their cells with; and when so many were abroad, the few that remained at home could not keep a sufficient heat in the hive to nourish up so large a brood: but perhaps thought I, the principal reason was the unexpected return of so severe a cold at this season; by which they were not able, by any power of theirs, to keep a sufficient heat in the hive (during the cold) to hatch out the young: further thought I, if they had considered that in so severe a cold, (which they had little expected to meet with after such a noble prospect) their whole bees could not cover the whole brood with a proper heat, therefore they would been wiser to have taken a proper care of the inmost bees about the centre of the hive, and thereby preserved a part instead of losing the whole. However thinks I, they acted no worse here than sea-faring men, when in great hazard of losing their ship, cargo, and lives in a storm, by being over-laden; yet are loth to abandon any part of their ship or cargo, expecting (with my bees) every hour better weather, and thereby would save the whole.

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You have seen I have given the excessive cold the whole blame of the above disaster which happened to my four hives. I had next to consider what to make of them, seeing the most part of the cells were full of rotten eggs and perished maggots: I waited other two weeks to see if the bees would desert that part of the hive, and lay eggs in other empty cells, and thereby repair their loss, but they did not, but continued close upon the dead maggots. I suppose they did that, because there were some cells here and there, with live maggots in them, but very few; for one live maggot there were forty dead. I resolved to let them stand still in the same case they were presently in, in order to see how the bees would do further in such a deplorable case; whether they would abandon the hive entirely, or if they would try to tear out the stinking maggots, and I thought that would save the combs. I waited till the beginning of *June*, and the bees turned very few, the old ones dying of age, and few or none to supply them; they decreased very fast from the time of the disaster to the beginning of *June*, they carried loads and bred some, but very little. When I turned them up in *May* and *June*, and looked down between the combs, I was unable to do it for the stench that the rotten maggots produced. I then saw plainly that they never were to turn to any account the way they were presently in; for though they were beginning to tear out some of the consumed maggots, and lay eggs in their place and increase a little, the season was going away fast, and consequently they would be of little value at the end of summer,

mer, perhaps not have 3 lb. of honey, whereas I could make far more of them another way, seeing they had a queen. I then immediately proceeded and took all the bees out of one of the hives, and put in an empty one; I next took all the bees (which were very numerous) out of one of the strong hives, which I told you was standing beside the mended ones, and put in another empty hive also. I then set down both the hives containing the Bees, in the very spot where they stood when in possession of their own hives, in order that they might keep their old stance: and then I took the hive containing the stinking maggots, and with an instrument made on purpose, cut out all the pieces of combs, containing the stinking maggots, among which were 200 young bees coming forward, in some of the cells which the bees had cleaned out; but I paid no regard to them, but cast them into my empty-comb barrel, that the cells might be made into wax, the next time I made that commodity. After that, I took the numerous bees which I had taken out of the strong hive, and put in the hive which I cut the combs out of, and set the bees exactly where they stood when in possession of their own hive, and they being numerous, soon filled her full of combs again. I then took the heavy hive, which was almost full of maggots in the cells, and had also, I judged, 10 lb. of honey in her: I then took the few bees which came out of the stinking hive, and put in her, and set her down in the place where the few bees stood before, and covered her well, and gave her a very little entry, in order to keep her warm to hatch out the young,

and in ten days time she hatched out a most numerous brood, and they were both thriving hives. I did exactly the same with the other three flinking hives, and changed their bees with three of their strong neighbouring hives, and they all did well, and gave me satisfaction, which I esteemed an excellent cure for so desperate a case. Though I have dwelt long on this subject, I beg the kind reader will bear with me a little longer, till I make a few remarks which may happen sometimes (though I hope seldom) to be useful to him in such a case. Some will be ready to say, if this be the consequence of your so much recommended reinforcing hives, you shall have all the pleasure and profit of it for me, I am done with it or ever I begin. Have patience a little, I pray you, and I will try to make you a profelyte, or you shall say me shamefully nay.

1st. I told you my hives were very bad ere I reinforced them, I am sure not worth two shillings a piece.

2d. After I mended them, I would not have taken sixteen shillings a piece for them, and had they escaped that unforeseen rock, there was none other for them to dash on, for they were proof against robbers and famine; certainly you would not advise a farmer to sow no more seed, because perhaps one year in twenty, his corn was mostly shaken with the wind; nor would you dehort the sea captain never to set to sea again, because there was a new found out rock, where only one ship was greatly

though rarely, happening Bees. 137

greatly damaged on, while hundreds escaped, especially as there was now a beacon set on it.

Had I not reinforced them, I would have lost them at any rate, and all I would have lost had I lost the whole, would have been only the common Bees I put to her, which would have been but a small loss; and even at the last her Bees having a Queen, I valued worth five shillings, so I was no loser, only that unhappy cold prevented me from being a very great profiter. Besides, were I afraid to meet with such an accident now, I could prevent it from happening, or mend her to better purpose after it took place. To prevent such a thing happening to Bees is to keep your hives very warm in spring, and if cold weather happens, shut their entries up, so as to prevent too great admittance of cold: and if such a thing were happening to a hive, as soon as known, cut out all her dead maggots, and add some more Bees to her immediately, and she will directly hatch again; and that is the cure will give you satisfaction.

Indeed I mean never to be discouraged by any such accident, but on the contrary, to use methods to make them hatch as fast as ever I can at all times of the year, especially in spring; and at the same time (when cold weather) to keep them warm, which will prevent the like disaster.

I am certain that the same disease happened to sundry of my neighbours Bees last spring, (which were neither fed nor reinforced) for I saw one of my neighbours hives which went

well in the beginning of the spring, but gave over carrying at the same time mine did, and did little or no business all the summer, and at *Lammas* I turned her up, and saw that they had not got out all her stinking maggots even then. But I think it is a distemper which rarely happens, and when it happens should be immediately cured by cutting out the spoilt combs, and adding more Bees to her: therefore in spring, whenever you see a hive that was a good carrier (and wants not food) turn to carry almost none at all, then directly turn her up, and look down between the combs, and take a small stick, and put in among the thickest of the Bees where the sealed up maggots will be, and with your stick rub off the head of two or three of the sealed up cells, and if fresh whitish maggots appear, with two brownish eyes, you may conclude the brood is coming forward: but if only a blancht maggot appear, or perhaps the cell seems to be empty below the covering, then if you can see twenty cells in this bad condition, you may conclude the brood is going backward, and you should cure the hive as above directed.

What I mean by giving the above relation is, to let my readers see that weak hives, when fed and reinforced, breed as fast, if not faster, than good hives, and also that such diseases happen Bee-hives, although not reinforced; and likewise to teach them how to prevent the like from happening their Bees; and also how to cure that disease in a hive when it has it.

It was not the reinforcing and feeding that killed the maggots, but the cold alone, as is certain

certain from my neighbours hives having the same disease, tho' neither fed nor reinforced; and I have had great numbers of hives reinforced, and do extraordinary well, and not a maggot go backward.

I cannot here pass unobserved what I saw among my Bees this day, being the 27th of *January*.—For seven weeks before this a severe storm of frost and snow had been upon the ground; during which time not a Bee could go out of their hives: I had a dozen of hives standing in one place, where they were all covered over with snow, (the most part of the said storm) infomuch that the tops of the hives were scarcely seen. The storm being ended, and this day being a bright sun about 11 o'clock, I carried the twelve hives to a pleasant quiet green, where I turned up every hive, and set her on her crown with her mouth to the sun, which shone down between the combs, and roused the Bees so, that in a few minutes they flew as thick about as if it had been the middle of *June*, and aired themselves, and eased their bodies; and I with a small stick searched some of the hives, to see if they were breeding any, and had the pleasure to see in one of them more than 200 sealed up young in their cells: I also with my small stick rubbed off the coverings of two or three of the cells containing the maggots, and saw them fairly formed, and perfectly fresh; and they will in other eight days time be out of their cells, (a fine young brood) and I expect they will continue to hatch on; I wish them good speed; I have set them down, and covered them well, and shall keep them warm,

warm, and do all I can to encourage them to go on in such a thriving and agreeable employment: I had another hive breeding the same way, but had not so many Bees in her, and thereby had fewer maggots.

I hope none ever after will assert that Bees cannot breed but when there are flowers in the fields for the Bees to gather off to nourish their young with; for mine have been breeding fast in the middle of a snow-wreath, and yet have not seen a flower these seven weeks, nor do I expect they will for other five.

All the twelve hives were a deal better of the airing they got this day, for at even they sang chearfully; and I make no doubt but it will encourage those that have bred none yet, to begin now, and those that are begun, to go on: besides, as they got their bodies eased, they are fit for another month's confinement, should bad weather take place.

Some may be ready to say, seeing all along you maintain that Bees should be properly kept warm, especially in spring, to prevent too much cold from perishing the brood in the cells, and you also as positively asserting that Bees will sometimes hatch young in the middle of winter, even in severe colds; please inform us what preserves the brood from perishing in the middle of winter, in the greatest colds, when a lesser degree sometimes is fatal to them in the spring? In answer I observe, that it is a certain degree of cold within the hive that perishes the brood, and not cold without the hive. Besides that, it is the hives that are fullest of Bees, and well covered over, with almost a

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To manage Bees in March, April, & May. 141

shut up entry, that hatch in winter. The Bees never coming out of the hives preserves a constant sufficient heat to bring forward the brood; and suppose they breed in winter, it is but few in proportion to what they do in spring, and those broods are in the very centre of the hive, and well surrounded with multitudes of Bees: but those that go backward in spring are generally in hives that are not full of combs, and thereby their houses are colder, neither have they such great numbers of Bees, and at that season perhaps too many of the Bees leave the brood, and go in search of farina to seal them up with in their cells; by all which causes the brood may be colder in spring, though not such cold weather, than they are in winter, in far greater degree of outward cold.

C H A P. XIX.

DIRECTIONS HOW TO MANAGE BEES IN MARCH,
APRIL, AND MAY.

THERE is a very great mistake which generally prevails in the spring among many Bee-masters: whenever a fine day happens in spring, good hives carry loads fast, and the Bee-master thinks they are doing very well, as so they are; but perhaps he has another hive that is a good weight, and well stored of honey, but

but has very few Bees in her, and consequently her Bees carry very few loads: which when the owner observes, he concludes she has eat up all her honey, and thereby is unable to work, unless she be presently fed, (for you are to observe, he dares not lift the hive from the board to see her state) therefore he, with all the speed he can, gives them a large meal of honey, to prevent them from dying of famine, the smell of which brings robbers (which are flying about in search of provision) in vast numbers to the hive, and they finding there a ready well-drest dish of good wholesome food, every way fit for their stomachs, (and few native Bees to defend it) they are not too ceremonious about who provided it, or who shall pay the reckoning, but e'en take a good hearty meal, and go home, and tell their brethren where they will meet with a well-covered table, and few to defend it, and then they will go in multitudes, and eat up all that was given to the hive, and afterwards ascend the combs, and make equally free with them, and so rob and steal on till the hive be entirely ruined; which loss proceeded merely from the owners want of judgment: as she had plenty of honey she needed no feeding, but as she had few Bees she should have been either reinforced or removed, or what is still better, both: but had he let her alone without feeding, she would perhaps have done very well, as no robbers would have been invited to her, they might not have made so free.

In the first week of *March*, in a cold morning, gently turn up all your Bee-hives, and carefully clean their boards, at which time you

will

will see if they need feeding or reinforcing: if a hive then is a good weight, and plenty of Bees in her, set her down again, and draw a little lime mixed with hair carefully all round her skirts *, and still keep on her little entry to defend her from cold and robbers; then give her a large new covering of tow or straw, in case her old one be much destroyed, the same way you was directed to cover them in page 80, and she will probably need no more of your assistance till swarming time. But if she have few Bees, reinforce her, as directed page 83; and if she have little honey, perhaps not as much as will serve her till the honey season, she must be fed.

The way to know whether a hive in *March* has as much honey as will bring her to the honey season cannot positively be fixed: the alone way is, if you poise her betwixt your hands, she will perhaps feel very light. Sometimes a hive will give almost over working, and then the case is desperate, for they are by this time much retarded in their breeding and working, but if you hit the nick of time of this calamity, and give

* The reason I direct to be so careful to lime the skirts and covers of the hives so pointedly at this season of the year is to keep the Bees as warm as you can in order to make them hatch fast, for it is a great advantage to keep them warm when hatching in cold weather, and in cold days and evenings in spring, the entry should be shut up so as to admit air only in order to keep them warmer, and cause them to breed fast, and preserve the maggots from perishing in the cells.

give them a hearty meal, they will fall presently to work ; therefore although a hive in *March* have 3 lb. of honey of her own, yet give her other 6 lb. of honey comb, and she will never trouble you with feeding her more. I say, any hive that you judge will need feeding, give her as many honey combs, the way you was taught in page 111, as will bring her to *June* ; but if you have not honey combs, then give her liquid honey, as directed in page 114, and never give them too little, for fear they should run out, when you are perhaps not judging any such thing ; but if you give them it liberally, they are faithful stewards, and will not waste it, but return you your own with usury : and be sure to feed Bees before ever their own stock of honey be near exhausted ; for if their stock be near done, and the honey season not near at hand, they are discouraged, and so breed and work very slowly ; but when so bountifully supplied before ever their own stock be near done, it makes them hearty, and carry on their work as briskly as the strongest hives : but hives that have plenty of provision of their own to serve till *June*, never give them any food.

In *March*, if you have a dozen of hives in one apiary, and all very good thriving hives, and no flowers in the neighbourhood, they will be much troubling one another by trying one another's strength in the robbing way, therefore I would advise you to remove six of the weakest of them to a mile's distance from their present stance, to some convenient part, as near flowers as you can ; suppose you should set them at the south side of some dike, or in a wood, or among

mong whins, or any quiet funny remote place: they being there set, will not be molested so with robbers. I have often done that way myself, and greatly to my satisfaction: no doubt, every one cannot have such an opportunity; besides, many are afraid of thieves stealing them clear off; therefore every one must do according to their situation. But I have often had many one standing in the midst of muirs, and among whins, and in a clover field, and cattle going round and round them, and yet never lost one by thieves but once; and I am certain I never lost five shillings by cattle turning them over, for I generally set the boards on the ground, and if any cattle accidentally push them off their board, as they are not high, they suffer but little by such disturbance. When I am among my industrious servants, standing in some quiet and remote place, and see them carry on their work with so much simplicity, alacrity, and cheerfulness, and singing so sweetly, they are fit to make me join the concert, and sing

*What's this I hear makes so melodious sound,
Surely I've got on some enchanted ground;
'Tis Canaan's insects that I here behold,
Whose legs do glitter like the yellow gold.
The whins and broom in lustre here do shine,
Whose yellow tops regale those flocks of mine.
Here silver streams in flow'ry valleys glide,
And rows of willows deck the river's side:
Here lambskins play upon the funny braes,
And sweetest nectar smells on clover lees.*

O

Here

*Here are the fields with Nature's colours dight,
Grateful to smell, and pleasant to the sight.
Retired pleasure soothes and calms the mind;
A noisy world oft leaves a sting behind.*

Sometimes in spring a hive will lose her Queen, and so will never do any more good. The way to know when a hive wants a Queen, and cannot raise one to herself, is, her Bees will immediately cease from working as soon as all the young in the cells are sealed up, and one may wait an hour at her, and scarce see a loaded Bee go into the hive: they consume their own honey fast away, and generally an unusual number of bees croud about the entry of the hive; and if she has been long without a Queen, and you turn her up and search among the cells, for to see maggots in them, there will be none.

As soon as you observe any of these melancholy signs, directly cut out from some of your other hives that you can come easiest at, a piece of comb three inches square, that has eggs in it; then turn up your queenies hive, and set her on her crown, and with your left hand shed two of the combs a little asunder, then with your right hand put in the piece comb between them, observing that the cells be put in the hive in the same order they were in their native hive—I mean the cells that were uppermost to be so still; then pull out your left hand from between your combs, and they will return to their natural posture; and so hold in the piece comb containing the eggs, then set
down

down the hive again, and the bees will be very happy that they are now put in such a state as that they can raise up another queen to themselves, and so perpetuate their species; and they will soon effectually fix the piece comb to the two combs it was put in between, and fall immediately to work, and build a royal cell about one of the eggs, and thereby raise themselves up a young queen, which will be to them as life from the dead. Sometimes in such a case, they will build two or three royal cells. I suppose the reason is, that they think if one prove abortive, another may hit; whereas when they build only one, if the maggot go back, they will have none to supply.

But if in spring you happen to have a hive that wants both a queen and new-laid eggs in her, and thereby cannot raise another, and so is in a desperate case, if she have few bees in her, then take them all out, and put them to some of your weakest hives, and keep the hive with the combs in it till you have a small swarm, and put them on it, and it will forward them greatly.

If in spring you have a hive that has few bees in her, and also little honey, and you cannot get bees to reinforce her, nor honey to feed them with, suppose you could get the bees; as she has very few bees, little honey or sugar will serve her, therefore remove her from all other bees, and give her a little food once a week, and perhaps she may come forward to be a good hive in harvest.

In *May*, if cold, rainy, cloudy, or misty weather happens to continue for eight or ten days,

then the bee-master should look well to his flock, and see that none of his hives be suffering by famine; for at this time their family is greatly increased, and they have many mouths, and thereby eat the remains of their winter and spring provision fast away; and sometimes even the very best of hives will be in danger; therefore in such weather in *May* or even *June* give every hive a little honey or sugar every day, (in a small kex * thrust in at the entry of the hive, which the bees will eat up) in order to prevent all suspicion, for now is the mouth of honey-harvest to them; therefore preserve your labourers, for as soon as the mustard is bloomed among the corn, or white clover shines upon the lees among the lambkins, an hour of a fine day will refresh them well, and put a period to your future feeding.

In spring, when the flowers* are beginning to open, the bees will visit them, and carry yellow loads from off them; and whenever one loaded bee is seen go into a hive it is a sign the flowers are beginning to spring, and there will never be a fine day during spring, summer, and autumn, but they will constantly carry on their beloved

* A kex is a small trough made of the joints of any plant that is pithy or hollow; one made of elder will do very well, and is easy got: select those joints that are longest, and not above one year's growth; with a knife make it a little flat on the under side to stand on the board: take the pith out of the upper side, so as to hold the honey, leaving a little of it at every end to prevent the liquid from running out.

beloved labour, and work with the greatest diligence and chearfulness.

The first day in spring I have seen a bee-hive carry any, I have only perhaps seen three or four loaded bees go in to her, the next day probably eight or ten, and so on; they gradually increase in numbers of loaded bees as the flowers increase in the fields, and the bees turn numerous in the hives, and about the beginning of *May*, when the whins and broom, and many other flowers shine yellow in the fields, then a strong hive of bees is all yellow loaded about her entry, (a very pleasant sight to see) and I have counted 100 loaded Bees go into one hive in a very few minutes.

Where the hives are all good they carry much alike, but they carry in proportion to their number of Bees: in some apiaries where there are four hives standing, one of them will perhaps have twenty loaded Bees go into her in five minutes, another fifty, a third ninety, and the last 120, all in the same space of time. But in the height of the honey-season they carry extremely fast, running out and in with the greatest precipitation and hurry, and their loaded Bees cannot be counted; whereas before the honey season, tho' they work very busy and constant, yet not in such a great hurry.

Were I to purchase a hive in *May*, and coming to an apiary in a fine day, where there were perhaps four hives, I would cause four men to sit down, one at every hive, for ten minutes, and each man count how many loaded Bees went into his hive during that time, and pitch upon her that had the most number go

in, provided she had some honey in her, and were none of the oldest.

The village I write from is none of the earliest, but I have had hives in it have nine or ten *Scotch* pints of honey in them in remarkable good years; but I esteem her a good hive that has four *Scotch* pints of honey in her.

Bees begin to carry sooner or later according to the goodness of the season and springing of the flowers. In 1779, I saw my Bees carry in the middle of *February*; and some hives swarmed that year in *May*, and my father had two top swarms, that each one of them swarmed again twice. The honey was very plenty that year, it sold at four shillings the *Scotch* pint, and some at three and sixpence, but ever since that year the current price of honey has been about five and sixpence.

Some years since I have not seen my Bees carry any loads till the middle of *April*, and they did not swarm till the beginning of *July*. I cannot pass over the year 1787 unobserved, which was a remarkable year for both flowers and honey; the white-clover heads, that year, where the ground was rich, were like small white roses for bigness. The most part of top swarms swarmed again.

That year I bought a hive (which was lying out, yet had not swarmed) from a neighbour of mine, on the first day of *August*, and took all her Bees out, and put them in a hive whose Bees died out of it in the spring, and so had only empty combs in it: the Bees were very numerous as they had not swarmed, and they cleaned out the hive in two hours, insomuch that I could

could have taken up a small handful of wax crumbles off the board, which they had cleaned off the mouldy combs. The flowers being vastly rich of honey, and bright *Phœbus* playing his part, favoured them greatly, insomuch that on the sixth day after the Bees were put in the hive, I took them all out again, and the hive was 15 lb. heavier than when I put them in, so that they had gathered two pounds and a half of honey every day for six days running, which I esteemed a remarkable gathering, which made me insert it here. As soon as I put in the Bees in the said combs, I put a large eek to her, and they filled it up with new work, the most being filled with fine sealed up honey; and by looking down between the combs, I saw about 100 sealed up maggots, which is a proof that in the height of summer the brood comes faster forward, they being sealed up in six days, whereas they commonly take seven.

When a large swarm of Bees is put in a hive that has empty combs in her, there being no young in the cells, the Bees have plenty empty barrels to put their liquor in, and have no other thing to do for some days after they are first put in but only gather honey, as they have no young to nourish up, nor combs to make to hold their honey; therefore their whole business is to collect honey, and they fill their hives surprising fast. I am certain that if a large swarm be put in a hive with empty combs in her, she will collect more honey the first week, than a swarm of the same largeness put in an empty hive will do in two. A swarm put on empty combs in the height of the honey-season, where

where they have plenty cells to put their liquor in is like some able fishers who have plenty barrels to stow their herrings in as soon as caught; whereas a swarm put in an empty hive has both her cells to make, and the liquor to bring home, and fill them with, like the poor fishers that in the time of the drove have their barrels to provide, and then the herrings to catch to fill them with; for the honey-season is the fam^{il} to Bees, as the drove is to the fisher.

If you have any very light hives in harvest, perhaps not above four or five pounds weight; take their bees out of them, and keep them carefully till next summer to receive swarms; and also all hives that may have died (by your neglect) in winter or spring, by cold, robbers, or famine, preserve them safe and clean from mice, spiders, &c. and put swarms on them in summer also, but too old hives, I mean those above four years old, I would not advise to keep them in order to put swarms on. In winter sometimes it happens, (though seldom, if well chosen) that the Bees of a hive will entirely desert it, and leave perhaps two or three *Scotch* pints of honey in it, I would not advise to keep such to receive swarms, but the heaviest combs, if in one side of the hive, may be carefully cut out, (which will be useful for feeding with in *March* if needful) and the empty ones, or those that are but partly filled with honey, may be left in her in order to receive a swarm next summer, and the Bees will soon fix all the combs, and mend all their breaches, and so make them to their pleasure. Often I have a hive that the one half of her combs is perhaps
two,

two, three, or four years old, and the other half in her only one.

Perhaps some readers may think that there is a vast deal of trouble in managing Bees, *viz.* to feed hungry hives, and to reinforce those that have few Bees, to preserve them from cold, robbers, mice, and many other enemies, and it is enough to fear one from commencing Bee-master. No doubt there is a good deal of trouble attends bad hives as well as any other thing that is bad; but the whole trouble arises almost altogether from keeping bad stalls; for good stalls need very little trouble, and afford a deal of profit yearly to their master. I have known some countrymen that scarce knew any thing of the nature of Bees, and never fed any, and knew very little about the wars of Bees, and scarce gave themselves any trouble about them, unless to divert themselves to see them carry, (happy men!) and to place a hive over a swarm, or make and sell their honey, and give them a good covering for winter, and yet they would have made three or four pounds sterling of their Bees yearly. The alone cause from which their good luck arose was their always killing all their bad hives in *September*, and at the same time keeping the prime and best of hives for stalls.

In the latter end of *May* or beginning of *June*, your stalls being well chosen in *September*, and still continued good, it may be presumed they will be turned very numerous of bees, and throng at labour in good weather, as the mustard and white clover will be making the very air to smell of honey, which will make them eager on work during the day, and sing
for

for joy through the night. Now is the honey-season, and farewell famine and robbers, for when there is honey in the flowers, they will never think of robbing; for I have sometimes poured a little honey on their boards to see what they would make of it, but they would pass by it as below their notice, and flown eagerly to the fields: they will omit no opportunity, but improve their time while it lasts, well knowing that if a change of weather take place, it will soon lay an arrest on their labours. As they increase in number their entries should be gradually enlarged, and care should be taken that too little an entry retard not their work, nor rub the loads off their thighs as they go into the hive; but those that are not so numerous in Bees, their entries should be still kept little to keep out the cold from damaging the brood: also their covers should still be left on the hives to keep out the heat in summer, as well as to keep it within the hive in winter; for cold and heat to excess are both prejudicial to Bees.

The entries to strong hives in warm weather should be very large, three inches long, and one high is little enough; it may be made that large by working in a piece wood in the hive (when it is made) four inches long, and one and a half deep, having a notch cut out of it three inches long, and one deep, as above, which may be lessened or enlarged at any time of summer (according to need) with a little lime. This sort of gate which extends in breadth is better than one that hath the extension of it to the height; for when the laden weary bees pitch upon the board before it, and running forward

to

to go in, if they fall not directly opposite to the door, they are apter to go wrong than right; and after going a good way round the hive in search of the entry, must return, which is a fatigue, and hinders them in their work; whereas when it is thus broad they will rarely miss it. Large entries in warm weather are very beneficial to bees, it gives them air, and thereby makes them carry on their work with more ease and pleasure; whereas when their entries are small, and a vast number of bees within, the heat is very great and fit to stifle them, and causes them many time (especially after a shower has sent them quickly home and into their hives) to come running out in multitudes for air, and incommodes them greatly in their work.

You will remember that in page 139, I told you that I had given twelve of my hives an airing on the 27th of *January*, and that two of them were breeding fast, in the following page: I say all the twelve hives were a deal better of the airing they got this day, for at even they sang chearfully; and I make no doubt but it will encourage those that have bred none yet, to begin now: they have not disappointed me, for this day, being the 13th of *February*, I turned up one of the twelve, and saw a very large brood in the cells, for three of the combs were lined on every side with sealed up maggots, and I judged they had about 100 young inclosed in the cells. I am of opinion that a good many eggs were laid that day and the following night that I gave them the airing; and if they had not been roused that day by the warm sun, perhaps they would not had half so many young in their cells

cells yet; also every one of the aired hives are breeding fast just now: no doubt good hives that were not aired then will be breeding too, but I believe not near so fast.

C H A P. XX.

OF THE SWARMING OF BEES.

NOW we shall give our opinion of the profit or loss attending the swarming of Bees, with directions how to further it, when it may be profitable; and also how to stop it, when it may be hurtful. You know I have all along been advising you to deal always in good hives, which will seldom fail to give you satisfaction, and far better have no bees at all, than have bad hives. I still give you the same advice in summer, therefore strive not to have many swarms, but good ones, I mean rather have one good swarm or hive, than three bad ones; but in case you can have both, many and good, with all my heart, so much the better. Many bees in one hive in summer is the principal thing you must aim at, and in case you have some hives that in the beginning of summer are still scant of bees, you will do well to reinforce them even then, as well as in winter or spring. First, there is no certain rule whereby we may know when a swarm will be profitable and when not. Much depends on the goodness or badness of the

the seasons, and also the early or lateness of them, and the good or badness of the old hives, and the early or lateness of your situation, and the large or smallness of the swarms:—Just as these combine in favour of, or against, your Bees—so will they thrive or dis-thrive.

Some early years bees will swarm very soon, perhaps in *May*, then they are sure to do well if the weather be favourable. In general hereabouts they swarm about the last three weeks of *June*, which is a very good time; and in 1787, I made many artificial swarms the last week of *July*, which did well, and filled their hives full of work, and stood the winter, and swarmed naturally next year: but indeed the flowers were remarkably rich of honey that year; and it is not one year in ten that swarms will do any thing worth while so late.

As we cannot assure ourselves of a certain rule when swarms will do well, we must be content with the most probable, and hope the best.

If you have a hive that increases fast of Bees in the latter end of *May* and beginning of *June*, and Drones appear in her; and as sometime before some water appeared on her board, about or within the entry, (which we call sweating) of an insipid taste, occasioned by the increasing heat of the Bees, the water will now be dried up by the still greater heat in the hive, by the bees turning more and more numerous; and the Bees about eleven o'clock forenoon will fly about in a reeling manner, and make a motion and noise about the fore part of the hive: this motion proceeds from numbers of young
P bees,

bees, which make their first appearance out of the hive, and fly off from the entry, and when in the air, turn their heads to the hive again, and fly round and round in a circular manner, and take a view of their stance, and all around them, and then light at the hive again, and go in; by this they are discerned to be young bees, as also by their colour and size, they being of a whitish and mouse colour; whereas the old ones are black and shining: they are also some less, tho' not a great deal, than old Bees.

Sometimes before a hive swarms, tho' they lie not out in clusters, yet every morning when they come abroad to work, a great many of them will stay about the door upon the board, and scatter themselves around the entry of the hive in a large circle; and many will climb up the fore part of the hive: this they will probably do for several days before they swarm. Likewise when they give over in the evening, you will perhaps see ten or twelve Bees standing in and about the door of the hive, with their posterior parts outward and bended up, and their wings in a continual motion, making a humming noise.

Writers differ widely among themselves as to the reason which causes Bees to swarm: the most part agree that a hive never sends off her first swarm, before her own hive be full of combs and Bees, so as she can work no more for want of room. Other some maintain strenuously that they will swarm when there is plenty room in the hive for them both to work and continue in it. Mr. Keys, in p. 96, maintains, that

‘that however capacious their hives may be, the Bees will certainly swarm——plenty of room induced mine to swarm——We may further notice, that in hollow trees, and under the roofs of houses, which afford the Bees unlimited room, yet it is well known’ (never by me) ‘that even in these situations they always send out swarms.’——His doctrine is perhaps full as sound in the next paragraph, though it does not coincide with the preceding, when he says, ‘On the contrary, when honey is to be met with early, and in plenty, and the bees have abundant spare room, it is a great chance if they swarm at all.’ And in page 115, he says, ‘If for several years together swarms come late, and perhaps some stocks do not swarm at all, tho’ the seasons be tolerably good, it may be taken for granted that the hives are too large, or the stocks too many; on the contrary, if the swarms be too early, and but scanty in number, it indicates the hives to be too small.’ Page 118 it is said, ‘When a stock is not wanted to swarm it should be raised as soon as the bees begin to work briskly.’ Very good:—we shall take it for granted that Mr. Keys means in the three last quotations that want of room causes Bees to swarm, and enlarging the hives prevents them. Altho’ they be not just so consistent as one could wish with his former assertion that ‘plenty of room induced mine to swarm.’

I have sometimes thought his book in general is not unlike a heap of uncleaned corn, that consisted of good grain mixed with chaff; for there is a deal of good observations made, and

directions given in it, altho' (a pity it is!) there are some gross errors in it, and pernicious directions.

My opinion upon the matter is, that want of room is the principal reason that determines Bees to make ready for swarming, and also to swarm the first time, when other circumstances concur; altho' it will not hold absolutely at all times.

'The principal reason why they swarm is the want of room; therefore in colonies where they are not at all straitened they seldom or never swarm except (says Mr. *Rusden*) thro' distaste, disturbance, or mismanagement.

'And in hives they swarm not merely for want of room without other concurring circumstances, such as a king in readiness, multitudes of subjects, prospect of plenty, together with weather which is inviting.'

It appears to me that a hive of bees, when they have plenty of room and are very numerous, are well satisfied with their condition, and love not to make any change as long as they have room to build cells to lay eggs and deposit their honey in; this is all they want. But as soon as every cell in the hive has either an egg or honey in it, and no more room in the hive to build cells for these purposes, and plenty honey in the flowers, and bees to collect it, and a pregnant queen to lay multitudes of eggs, but no room to hold either of these in the hive: then the bees see that they are under a necessity either to give over breeding or working, or perhaps for some time both; or otherwise raise up a royal cell about one of their eggs, which

in due time will come forward to be a queen, and so make them capable of sending off a young colony, as the weather and other things assist. Then the royal cell is built and coming forward, and by the 12th day of its age a great many more young bees have emerged out of their cells, and the hive not being able to contain them for heat and want of room, they cluster in large quantities about the entry and upon the board or fore part of the hive, and carry on but very little work, as there is still no room to stow any more honey. Then about the 14 or 16 days age of the royal cell, the weather being very favourable for swarming, and the community now knowing that they are doing very little the way they are presently in for want of room, and as there will be a young queen bred in the hive soon to be the mother of one of the hives, they think it most prudent for the old mother to go off with a swarm directly, rather than wait for the birth of the young queen.

As soon as agreed on, the weather being good, the old queen goes off immediately with a swarm and leaves a pregnant royal cell, which will produce a young queen in perhaps two or three days to supply the old hive with. The old queen going off with the swarm is capable to lay eggs immediately that very day as soon as there is a piece comb built to deposite them in; for I have oft seen the like in a top swarm the second day after she had swarmed I have seen a large piece comb in her, and some honey in a few of the new-built cells; and also more than two score of new-laid eggs in the

other cells, which made me think it was the old queen that came off with the top swarm; for I thought had the young queen in the second day of her age come along with the swarm, she would not have been capable to lay eggs till about three days after, being then five days old, in which age she is capable of becoming a mother.

I have many times seen, in a second swarm, which I was certain had a young queen in them, that not a single egg would have been laid for two or three days after they commenced a swarm; but I judge a hive seldom swarms till she have a young queen bred in her, and so has two queens, one of which must go off with a swarm the first favourable opportunity, or otherwise it will cost one of them their life for their delay; and when bad weather had set in for eight or twelve days after a hive was ripe for swarming, I have sometimes seen a dead queen thrown out before the entry of the hive, and she would not have swarmed, or another queen was bred; the bees perhaps, in a fit of despair, thought the weather would never mend, and that it was foolish to think of swarming and dividing houses, for who would go off to a toom house to perish in it in such unfavourable weather; therefore they, out of their too hasty-drawn conclusions, gave up with all natural affections, and most barbarously murdered one of the queens, (perhaps their own mother, reserving the new-hatcht one for themselves) and tore out all the drone-maggots from the cells, root and branch, and sometimes (altho' exceed-

ing

ing rare) killed a good many of their brethren.

But altho' it is certain that bad weather continuing very long after a hive is ripe for swarming will sometimes, tho' very rare, dispose the bees to kill one of the queens, and thereby make them unfit to swarm when the weather turns good; yet in general they do not do it, for it is well known that a hive will be fit for swarming, and just beginning to rise in order to swarm, but a black showery cloud arising, will prevent them that day; and cold, cloudy, or showery weather continuing for perhaps other ten or twelve days will keep them from doing it: and yet after whenever the weather turns good, and they get a blithe blink of the sun, they will hurry out in great haste, and swarm.

Small swarms are not worth keeping single by themselves, for they seldom ever turn out to any good account; and a hive that has few bees in her, if she swarm, her swarm should be returned to her again, or both her and her swarm bees should be enlarged with other two hives that are both full of bees.

Strong hives will send off large swarms, and still be good themselves; therefore they may be kept separate, and both do very well, if not too late in the season; but should the owner chuse to prevent her from swarming, he may, as soon as she turns throng of bees in the latter end of May, give her an eek 3 inches high, and whenever she fills that, and turns throng again, give her another eek, and so on during the summer, by which he will prevent her from swarming, and she will, in this way of being always enlarged

larged as she grows throng, and kept in one apartment, make a grand colony *, and collect as much honey (if not more) than she and her swarms would have done altogether, suppose she had swarmed once or twice, and each one of them all been kept separate in hives by themselves.

My opinion is, that whenever the cells are turned so full of eggs, maggots, and honey, so as the bees soon will have no more room to stow their honey in; then the bees build a royal cell about one of the eggs, in order to raise a queen; and if the weather be very tempting †, and honey plenty in the fields, then about the 14th, 16th, or 18th days age of the cell, the bees perhaps will swarm; but if the weather be but middling good, then they wait or the young queen be born and fit to fly off with the swarm; and in that case I know not which of the queens goes off with the swarm, nor which stays.

* By colonies I mean a very large number of bees in one family, either dwelling in different apartments, with communication to each other, or in one single hive.

† Extraordinary good weather will tempt bees to swarm oftentimes when they are not perfectly ripe for it; for in such weather they are keen on swarming, and a good many will swarm in one fine day, some of which, it is likely, would not have swarmed for eight days to come, had not the weather provoked them to it. Some of which the old queen went off with the swarm, and left a pregnant royal cell in the hive, to supply her with a queen.

stays with the mother-hive, any of them, I suppose, will answer any hive.

It is well known, perhaps some will say, many a hive will lie out in great clusters about her entry, upon the board, and fore part of the hive, as large as a swarm, sometimes for ten, twelve, or sixteen days, and then swarm after, and sometimes not swarm at all that year, and yet the weather extremely good, and a great many hives keen on swarming.

I answer, perhaps that hive has been long of building a royal cell, and will not swarm till a princess be born; but it is seldom that a hive that lies long out does not swarm at the last, if the weather still continue to be favourable. But it may happen that the maggot contained in the royal cell has turned abortive, or been destroyed by some accident, and the bees are preparing another royal cell, or else thinking that the season is too far spent for them to divide now, and so have laid the thoughts of swarming entirely aside; for were there never such a large heap of common bees in a hive, they will not swarm without a queen to go along with them, (and indeed without a queen they cannot constitute a swarm) and also another or else a royal cell to leave in the mother-hive.

It seems to me that the principal reason that a hive of bees lies so long out oftentimes with great multitudes of bees about her, and yet does not swarm, is their not having a young queen bred as yet, and thereby two, whereby one might go off with the swarm, and another to remain in the old hive; for I am of opinion, that whenever there are two queens in a hive,
and

and multitudes of common bees, and an inviting season, that they linger no longer, but immediately go off in a swarm.

Sometimes (but very seldom) a hive will swarm the first time when none is expecting it, and very few signs of swarming about her; she will do it when she neither is lying out, nor very full of bees. In such a case there has (no doubt) been a queen bred sooner than their ordinary method, and it is no argument against the general rule, that bees swarm commonly the first time for want of room.

Very warm weather will cause hives that are not very full of bees to lie out, but whenever cold weather returns, they will go all into their hives again, and draw themselves close together among the combs, and also desist from making a noise. Although a hive be very full of Bees, and lie out in large quantities a long time in warm weather; yet the return of cold will make them all flinch into their hives again, and the owner thinks now all hopes of swarming are lost, whereas, perhaps the next fine day (if a queen is bred) they will hurry out and swarm.

From what has been noticed we may see, that the owner cannot be certain of the day in which his bees are to swarm, nor whether they will swarm at all, because he knows not whether there is a royal cell coming forward at all, or if coming forward, what time the young queen will be bred, or even when fit for swarming, whether the weather will permit them to do it; therefore whenever a hive in *May*, *June*, or *July* (the common swarming time) turns pretty throng of bees, works briskly, and sounds

loud

loud at night after they give over work, with some drones appearing and flying about in the heat of the day; the bees also make a reeling motion and noise now and then in the heat of the day before the hive, as formerly observed; then the owner may hope that there is a pregnant royal cell coming fast forward, or perhaps what is better, a young princess already in the hive; if the former is the case, the hive will not probably swarm till the queen be out of the cell, unless the weather be very tempting; but if the latter, they will swarm the first favourable opportunity; therefore as the owner is uncertain which is the case, he also cannot positively know the day when they will swarm, for which reason he must give them a constant attendance every fine day, from eight o'clock in the morning till three in the afternoon, when their throng will be mostly over, till that agreeable event takes place, which most every one wearies for.

Of Hives to receive Swarms.

AS to the proper houses or habitations in which bees work, which we call hives; they have been made of different materials and forms, according to the different taste and inventions of men in all ages. *Melissus* king of *Crete* is represented to have been the first that invented and taught the use of hives for bees to collect

collect honey in ; which is become so beneficial to the health of man. History affords several instances of honourable persons in former ages, who have been so delighted with these excellent creatures, that several of them caused hives of horn to be erected in their gardens, that they might with greater ease and admiration behold their works. But in later times hives have been made of glass, by which we may more minutely observe their curious works and operations. Hives also have been made of wood of different forms and constructions ; sundry ingenious gentlemen have made hives of both wood and straw, to consist of different apartments, and inhabited only by one swarm, which are commonly called colonies : all of which may be done to satisfy curiosity, but is not of so great utility as the simple, cheap, and easy got, single straw hive ; glass hives serve to let us see how they work, but the light incommodes them in their work, and they are also too cold in winter, and so brittle, that they are easy hurt, and never will be rendered to public use. Colonies, that is, one family of bees living in two or three different apartments, I do not much approve of, for these reasons, the partitions between room and room, prevent a gradual heat to overspread the whole family, by which some of the rooms may be too cold, and in winter the bees will draw all to one apartment, by which the rest is intirely empty and exposed to cold, and thereby their honey may candy and turn useless. The colony method is contrary to their way of doing, for give them their own will, then they always lodge in
one

one apartment, if it is capacious enough to hold them; besides they lay their eggs and hatch them forward in the middle parts of the combs and hives first, gradually enlarging the brood around the centre of the hive, whereby they get them the better surrounded and defended against all hazards and inconveniencies, and by the greater heat there, than more outwardly, they get them the sooner and safer hatched. It is certain that cells in the middle of summer are seen in the outmost combs in the hive, containing young, but it is after all the inmost cells are so full that they cannot hold any more eggs; certainly every one in the family will best know what part to act when they are all in one house together; whereas, when they are obliged to perform their office in two or three distinct apartments, they are not capable to execute it so well; also when a bee comes home loaded and weary from the fields, they sometimes have to travel up one or two pair of stairs till they win to the uppermost story to stow their burden in, which fatigues them greatly. Colonies as yet have never been, and I think never will be, extended to general use, although it is near two centuries since their first invention, by *John Geddy, Esq.* My humble opinion is, that a large number of bees, lodged in one sufficiently large single hive, being all in one apartment, will thrive better and collect more honey than when they are divided into either two separate hives, and thereby become two distinct families; or put in two or three distinct boxes with communications between each box, and yet only one family. Single box hives well made, will do

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very

very well for bees, and when painted will last a long time, and are proof against mice, only they are warmer in summer and colder in winter, and thereby are not so much brought into general use as straw hives. Were I determined to take a swarm in harvest, I would put her in a box hive, for I think they make honey some faster in them than in a straw hive, as it is perfectly smooth and clean: at first the Bees have nothing to do but begin immediately to build their combs in it; whereas in straw hives, especially when ill made, they have many times much work to gnaw and bite off all the staring loose straws in the inside of the hive, which consumes some of their time that should be employed to better purpose in such a season.

I have seen in some years when the bees had swarmed very liberally, that the owners would have been much put to for want of hives to hold their second swarms in; there is no great need for being much disturbed in such cases, for when you are designed to kill them in harvest, and all your empty hives filled, you may put them in a great many other things which they will work in, such as any kind of box, or half barrel, or large jar, or pot of any kind, if large enough; for the Bees are not nice, they will work in any place in summer, for you are to understand, that although making honey and honey combs is so natural to them, insomuch that they can work at no other manufactory; yet the shop they make them in is not so, for they can work in almost any part, if room enough, and not too cold or wet; even darkness
itself

itself is no impediment, but rather renders their habitation more agreeable.

In some things bees are very prudent, and discover a deal of wisdom and sagacity, witness their wisdom in building their combs in such a regular form, with a proper distance between one comb and another. Some cells appropriated for nourishing up the young, and others more capacious for holding their honey, also they know when a blast or shower is preparing; for should a black cloud appear when they are in the field at their work, they quit their labours and fly home in the greatest hurry and precipitation; and should it be very windy, they carry small stones to balance them in their flight, as I have seen in such cases the stones (smaller than pease) lying before their entry which they had dropt at their arrival.

*And lest their airy bodies should be cast,
In restless whirls, the sport of every blast,
They carry stones to poise them in their flight,
As ballast keeps th' unsteady vessel tight.*

VIRG.

but it must be confessed that though they are very sagacious, as appears in some things, yet in other some of their conduct they appear to be mere dunces and arrant fools; for often in a showery day when the sun gets out his head and shines with a blithe blink for an hour or so, they will swarm and light on some high branch of a tree, and were they left to their own discretion in such a case, the sun hiding his head, and a severe shower of rain and wind at the same time happening, would drown and dash them

useless; and often they will begin to work and build combs, even hanging on a branch, or among the clefts of some tree, or perhaps on some chimney-top, &c. where (had they their wits about them, they might see) they would be exposed to ruin by the next blast of wind or rain.

And by the by, here I cannot but ask those profound heads, who sometimes tell us very gravely and wisely, that bees thrive best without our care, and need none of our assistance; what will become of that hive hanging dadding in the wind and rain, which nature took up to that uncommodious habitation. But here perhaps they will hide their heads, and contradict themselves, and do every thing in their power by art, to lodge them in some commodious artificial habitation: but why all this? does not art make hives, and lodge swarms in them? does it not choose proper stalls, and cover hives to preserve them from cold and rain, robbers, mice, &c. in short, if art did not assist nature, I doubt much if we would have a living hive in *Britain* twenty years hence, were we to leave all the hives as they are; some of the old ones might swarm for a year or two to come, but by settling on some improper place, they perhaps would be mostly killed in ten days time; but should some swarms accidentally or by search, find out some more commodious habitation in buildings, rocks, or hollow trees, the winter with his cold, snow, rain, and mice, would put a period to their lives, and the old hives would soon rot and die of age. Well, as art is so necessary in the management of bees, let us make use of it, provide

provide proper houses or hives for our approaching swarms.

Straw hives are easiest got, and have been recommended and used by almost every bee-master in former ages: they are coldest in summer and warmest in winter, which is enough to recommend them.

As to their form, I have seen them about *London*, and they are made very thick and strong of the rolls of straw; and some narrower at the mouth than in the middle, by which the combs are supported with fewer sticks in them than when they are as wide at the mouth as at the middle. The top of the hive is not of a pyramidical form, but betwixt that and a circular; so that the hive is something of a globular form, and the nearer it is to that, the warmer are the bees.

As to the size, one that holds five forpets of *Berwick* measure is a very good one, and will hold a pretty large swarm; but there is no exact rule to know what hive will be exactly filled by a swarm; much depends upon the following season, if the swarm is early and large, it requires the larger hive, but if late, the hive should be some less. If a swarm be put in one of the above size, and the bees fill it soon, and want more room, it may easily be enlarged by putting an eek below it; but if it be not filled quite full, it will probably not be weight for a stall, in which case there will be no loss, but if it be not full of combs, and yet weight enough for a stall, it will do, though not quite full of combs.

Q 3.

A hive

A hive when made should have a piece of wood wrought in the undermost roll, four inches long, with a notch cut out of it three inches long and one high, for an entry to the Bees to go out and in to their hive. Wheat or rye straw makes good hives; and the heads of the straw should be cut off; the rolls should be very hard drawn and wrought together by brambles or small willows, split down the middle, and properly drest, having the pith taken out of them: the hives should be made as smooth as possible, having no projecting or staring straws; which if not properly cut or singed away, (which should always be done when the hives are rough) would cost the bees a great deal of trouble to gnaw away when they are first put into them. After the hives are made, and if need be, singed gently with a wisp of straw, four small sticks should be run cross the hive, in order both to keep the hive firmer, and support the combs from falling down by their own weight, and also to prevent them from going out of their proper place when the hive is any way disturbed or turned up and rapped on. The first stick should be put in two rolls above the entry; and the second two rolls above the first, exactly to cross it in the centre of the hive; the third should be put in two rolls above the second, and also to cross it and the first exactly in the centre of the hive; the fourth and last stick should be put two rolls above the third, and so as to cross all the other three in the centre of the hive: by this method of putting in the sticks so as to cross each other in the centre of the hive, whatever way the combs be built

built they cannot miss to be supported by the sticks. The most people put in a middle stick to stand perpendicular, in order, say they, to support the hive from sinking down under its own weight; I never saw any good it did, but often ill, for which reason I never use it: it can bear no weight unless standing streight up, and the under end on the board; and whenever the hive turns old, and sways to one side, the middle stick is useles as to bearing weight; besides it bears some of the combs next it to their fellows, and thereby displaces and injures them: and often I have seen, when a hive was set down on its crown in a hurry, that the weight of the hive would have rested upon the top end of the middle stick, and borne it back again into the hive, which would also have pushed back the combs that were fixed to it, and thereby done much hurt; for all which reasons never use a middle stick.

For every good stall you have provide two hives and two boards, and should not every hive swarm twice, (as indeed I would seldom suffer them oftener than once) yet you can be at no loss to have spare hives by you, as they may be useful to you when you reinforce a hive, &c. Your boards should be made of well-seasoned-wood, and if you can get a deal-board about 18 inches wide, and 22 long, and inch and half thick, which being well planed, and made even on both sides, it makes an excellent board. When the board is foul, and wants to be cleaned, it needs only to be turned upside down; besides, as it has no joining in it, the drought in summer does not make it chink and rive

rive so as one that is made of different boards; but in case you cannot conveniently get boards all of a piece, then take two pieces of boards of the same length as above, and nine inches wide, but only three-fourths of an inch thick, which when joined will make the same breadth; and take two pieces of board 18 inches long and 11 broad and 3-4 thick, and nail them on the other two boards, which will make a very good board, altho' not all of one piece.

An old hive, if not rotten or torn, will do very well to put a swarm in, especially one that you are determined to smoke in autumn: if it is musty, holding it over the fire a little will sweeten it, and the Bees will be fonder of it than a new one.

In handling bees at any time, particularly when driving them, or managing a swarm, boldness and gentleness are both necessary; every motion must be done deliberately and without hurry; the operator may drink a cup of good ale, and rub some of it over his face and hands: also be careful not to bruise any of the Bees.

When a swarm is flying in the air, or settling on a bush; or so, they are not apt to sting, but are very gentle and mild, their minds being entirely engaged in their present business, they have no time or inclination to quarrel: but as soon as they are settled on any place, they look upon it as their castle, and whoever attempts to storm it in a rude manner, is sure to meet with little mercy from the inhabitants.

The morning before a hive swarms the Bees oft come out of the hive in large numbers, and cluster

cluster upon the board and fore part of the hive, and carry on their work very slowly. Immediately before they rise in a swarm you will see numbers of Bees flying before the hive in the reeling way, and observe their increase and noise grow greater: those about the entry will begin to make greater stir. You will also see them thronging in great haste out of it, and thus they will continue to do till they are all come off.

It is a very surprising thing to see them coming out of their mother-hive, and deserting her so fast with the greatest hurry and precipitation imaginable, insomuch that they can scarce clear the way to one another: a stranger to the nature of Bees would be ready to conclude that there was some dreadful enemy within murdering every one it could come at, and that the Bees were flying before it for their life; or else leaving some disagreeable habitation, in which there was nothing but poverty and war, and going to some plentiful place, where they would be more happily accommodated: but the reverse is exactly the case, for they are going of their own accord with the greatest cheerfulness from their dearest friends, and also from a well-stored house with plenty provision in it, to seek their fortune in the wide world, where they will have both their house to plenish and fill with provision, in case the fickle weather will permit them.

It has been an ancient custom, when a swarm of Bees are rising, to make a tinkling noise upon a pan, kettle, or the like; the practisers of which alledge, noise makes them settle the sooner,

er, and prevents their flying away. A great many others look upon it as an useless ceremony, and rather prejudicial. My opinion is that noise prevents them from hearing one another's sound, and thereby from understanding one another's intentions; therefore in some cases it may be useful, and in others hurtful: when they are coming regularly off their mother-hive, and settling deliberately on any thing near her, in this case noise would be very prejudicial to them, therefore it should not be made, as it would prevent them from hearing one another's sound, and knowing each other's intentions. But when they fly long and high in the air, and seem as if they intended not to settle, but to be upon a march, then give them a serenade, and make all the noise you can upon drums, kettles, or whatever you can, not to make them a compliment upon their departure, but if possible to confound and frighten them, so as that it may perhaps either dispose them to settle, or return to their mother-hive again. It has been known that when a swarm of Bees has been flying away, the discharging a gun among them loaded with powder only has disposed them to light immediately: the report, I imagine, has perhaps been taken by them for thunder, which they are always afraid of, and puts a stop to their mirth and schemes, and thinking it was to be an immediate rain, it was most prudent to take the nearest lodgings.

Sometimes (though seldom) a swarm will fly clear away, notwithstanding all the methods you can use, especially in very fine calm weather when they have had liberty, some days before they

they swarm, to roam and fly about in search of a commodious habitation, which if they have found, it is not easy to hinder them from going to it; and indeed sometimes it cannot be done at all.

When the weather is very fine before they swarm, they oft send out scouts and spies in search of a proper habitation for the swarm to go to, and if they, in their search, find a dead hive in any deceiver's yard, or empty place about the roof of a gentleman's house, or a church, castle, or trunk of a tree; especially if bees have wrought combs in it the summer before, but have died out of it in winter, they will esteem it a happy chance, and send off a squadron of Bees for three or four days before they swarm, in order to clean it all out, and make it fit for the swarm's reception the first favourable opportunity. At such places I have seen a good many Bees going out and in, and cleaning out all dead Bees, broken crumbles of wax, or whatever would annoy them: and sometimes there would be Bees at such places from two or three different hives, all laying an equal claim to the supposed habitation; and they would have been fighting and killing other, and a good many slain; and it has been known that two swarms have flown to such a place in one day.

Many instances there have been of a swarm of Bees flying in a streight line to a dead hive standing within their reach in a neighbouring apiary; the dead hive having been left standing by the owner either out of ignorance, as not knowing she was dead; or if certain, never
dreading

dreading the bad consequence: but they are also sometimes left on purpose by rogues, in order to entice their neighbour's swarms, which is the same as, if not worse than, stealing a swarm.

Mr. *Maxwel* says, there is a law against suffering a dead hive to stand in an apiary; if there is, it is a very just one; but if there is none, there should be an act of parliament made against such a pernicious practice. Several times such cases have been tried in courts of justice; and some judges have punished such a practice, which was perfectly right. But I lately heard of a case of that kind which was tried in a court, and the judge let the aggressor go off with impunity, alledging that every man had liberty to keep in his own yard what he pleased; by which he shewed his ignorance; for were such a practice suffered to prevail, none would be sure of a swarm of their own Bees; for a dead hive left standing in an apiary all the summer, seldom misses of a swarm coming to it.

There has also been much trouble to know whether the old hive was dead or not that the swarm went in to: as to that I know for certain that a swarm will not fly a mile to a living hive to light on her, altho' they will fly four and more to light on a dead one.

Indeed I have seen a swarm go on to a living hive, that stood in the same apiary, but this was rather accidental, the Queen returning home in confusion perhaps might take another hive for her own, and in such a case there is sometimes, tho' not always, a great battle,

battle, and many slain, often the Queen among the rest: but sometimes I have seen them agree very well at the first, and make a good colony, when properly raised with a very large eek: at other times I have seen when a swarm had gone on another old hive, that they would have remained very peaceably, and the swarm come off the next day.

When a swarm flies away with a design for some habitation their spies had been previously at, they fly in a streight line to it; therefore run or ride along with them as long as you can, for sometimes they will fly very slow, so as you may keep company with them; but in case they never mind you, but bid you farewell, you'll perhaps be loth to return the compliment, but would fain meet with them again; therefore follow them in the same line, without turning to any side, by which if they happen to light on any thing, such as a dike, hedge, or bush, you will have a venture to find them; but if not, still go forward, and if the line lead you to any garden where Bees are standing, tell the owner your case, and if he is an honest man, he will give you leave to look at his bee-hives before him and witnesses. The way to know if your swarm is gone into any of his dead hives (if he has any dead) is, you will perhaps see some small crumbles of wax not unlike saw-dust, lying before the entry and on the board of the hive, which the Bees have cleaned off the combs; if you see that about any hive, you have some reason to suspect, and may demand a further search, which if granted, turn up the hive, and with a small stick search among the combs for young

Bees in the cells, as directed in p. 138, which if you find, it is a sign she was a living hive before, therefore claim no right; but if there are no sealed maggots in the hive, then you may claim her; which if he refuse to give you, then immediately, as long as the hive has no young in the cells, apply to a magistrate, and lay the case plainly down to him, insisting on that noble argument as a proof of the man's hive being dead, seeing she had no maggots in her cells. If the magistrate do you justice, you will get the hive, and the man punished for his covetousness in not returning you your lawful property. But if she is not lighted in the first apiary you come at, you may still go forward, if you think there is another apiary in the straight line, and if there is, do as in the former apiary. You will by keeping the line have also a venture to come on the swarm by the way, in case they tired and took a rest on any place; but if some gentleman's place, church, or any other building be in the line, view them attentively as you go along, enquiring at all you meet with if they saw a swarm of bees flying; for often knowledge is got by being prudently inquisitive, and none will readily take it ill for you in your hurry to ask them such an useful and lawful question.

If they have settled in any of the buildings mentioned, directions will be given how to take them out in case 16th.

When a swarm of bees are rushing out of their mother-hive, before they be all out, it is very common that some of them which come first out will be beginning to settle upon some things,

thing, perhaps some branch of a tree, or a hedge, or gooseberry-bush, or potato-shaw; for there is scarcely any thing but they will light on, they will settle on whins, nettles, kail, dikes, trunks of trees, and even on red land, for they pay no regard to the beauty or ugliness of the place or situation where they settle: it is in vain to think to decoy them to settle in a hive or any place, unless you get hold of the queen, and that cannot be done when they come off of their own accord.

It appears to me there is no certain rule among the bees who shall come first out of the mother-hive when they swarm, whether queen or commons, or who takes the lead, and fixes first upon the place to settle on: I suppose it is among Bees as in some other assemblies not too ceremonious, where those that are next the door come first out, whether queen or commons; and when they settle, they seem to go on the same plan—the first Bees, whether queen or commons, that accidentally light on any place, lay the foundation of the swarm, and the rest all follow, and build upon it; for proof of which I have seen the most of the common Bees settling upon a bush, or ever the queen had left the mother-hive, and as soon as she left it, she would immediately flown to the increasing swarm, and joined it. Again at other times I have seen, when there was but one queen came off the mother-hive yet the Bees would have settled in two or three different clusters, and of different sizes, at some yards distance from one another, in that case the queen could only light at one of them, and which ever

one it was she hit upon, (whether the largest or smallest) she continued there, and the other queenless clusters gradually arose, and joined her increasing company, till they were all united in one entire swarm.

Some advise, whenever the swarm is beginning to settle on any place, and is as large as a man's fist, if it can conveniently be done, to place a hive immediately over them, and they will go directly up to it. This, I think, is too precipitate a step, for if the queen be not come there as yet, it will both disturb the bees, and perhaps may retard or perfectly hinder her from lighting among them; besides when a person is going among such a throng, and disturbing them when their minds are so much taken up upon their present business and state of affairs, they may perhaps think, What is this bulky animal doing among us? we want none of his company, we can hold no communion nor carry on any traffic with him; he has neither wings to carry him to the flowers, nor a proboscis to cull their sweets, nor has he proper cavities in those two long and large hinder legs of his (rather like trees than any thing else) to hold the balls of farina on; he is such a heavy lump, and a monstrous dead weight, that were he to creep with these four legs of his upon our waxen edifices, they would sink below him, and bring immediate destruction on both us and our building:—What has brought him here among us? we are got into bad company; let us retire from hence, and seek out a more quiet and remote habitation, where we will enjoy, what we most desire above all things, a retired life. Be-

sides,

sides, when the owner is going among them while a great many are lighting so fast as yet on every thing around the place where they are settling, a few of them may be trod to death, and such a thing may happen as the queen may suffer among the rest; therefore I think it is far better to let them be fairly settled, and something quiet, before you proceed to hive them; however as soon as they are all fairly settled in a cluster, no time should be lost, but a hive should be immediately placed upon them with all convenient speed, in order to prevent their rising again; for it is thought, as soon as a swarm is fixed, they send forth spies to search out a more commodious habitation, which if they find, they return immediately, and inform the whole community, and they rise and fly off to it.

And it is also known (as formerly noticed) that a hive sometimes for two or three days before the swarms sends off spies to search out a convenient habitation for the swarm to go to when ready, and supposing it to be the case that they know where they are designed to take up house before they swarm, yet when they come off, they generally settle on some part in order that they may be gathered altogether, and thereby more fit for a remove: but if they find a commodious lodging placed over them in some miraculous manner they know not how, they are often very happy to find it, and immediately range themselves in it and begin to work; but if they are intent upon some previous sought out habitation, it takes some pains to keep them in the hive you supplied them with. If one swarm

is in the air flying, and another hive be preparing to rise, stop her by throwing a sheet over the hive, till the other be fairly settled, after which remove the cloth from the other hive.

Now as to the hiving of swarms, here a large field opens itself to our view, and such multitudes of different circumstances will occur when bees swarm, that there cannot be particular directions given precisely to answer every case; but we shall give several directions how to manage them when swarming in the most common cases that occur on such occasions, from which the prudent bee-master may learn how to manage his bees in almost every case.

C A S E F I R S T.

If you have a hive in the beginning of summer, that by computation you judge she has 12000 bees in her, and also 10000 maggots in the cells, and another hive that has only 3000 bees in her, and 1000 maggots in her cells, by which you have a very strong hive and a very weak one, and perhaps you wish they were both strong alike, or both equal of Bees; then you may take 9000 bees from the strong hive, as directed, page 81, and reinforce the weak one with, as directed, page 83; by which every hive will have 13000 bees and maggots in her, and so equal in number, and in eight or ten days after a great many of the maggots will be turned into flying bees, so that they will be much about the same number of loaded bees go into each hive in the same space of time: or you may exchange the whole bees of both the hives in the following manner: drive all the 12000 bees out of the strong

strong hive into an empty hive, as directed, page 81, then drive all the 3000 bees out of the weak hive in the same manner, then turn up the 3000 bees with their mouth uppermost, and the same instant, place the heavy hive containing the 9000 maggots on her, mouth to mouth, and they will soon run up and be very joyful to go into so well a plenished house; then set her down in the same stance the weak hive stood before the exchange, by which the 3000 bees will just be where they were, and not have a new stance to acquaint themselves with: then give her a very little entry to preserve heat in her to hatch out the maggots with. Next, place the weak hive containing the 1000 maggots, over the 12000 bees, and after the bees are all up, set her down where the strong hive stood before, and they will both thrive well. I have often done this way myself, both in spring and summer to my satisfaction.

C A S E S E C O N D.

If a swarm settle on any thing that can be brought to the ground, then spread a sheet on the ground near the place where the swarm is, and lay two sticks on it, about a foot asunder; then bring the swarm and lay her upon the sheet betwixt the sticks, and gently cover it with a hive*; the edges of which must rest upon

* Some advise to rub the hive before it be placed over a swarm with a little honey or sugar and ale mixed together, or some sweet herb, in order to allure the

on the sticks, which will prevent it from crushing any of the bees, and also will have both air and access to go out and in to the hive; then cover the hive with a cloth to keep out the too great heat of the sun from incommoding the bees, and thereby (as has sometimes been the case) provoked them to rise and seek out a more cool and comfortable habitation. If they like their new house they will soon go up into it and fall heartily to work, unless upon trial they alter their mind, and resolve to leave it. Sometimes I have seen them stay two or three hours in it, and begin to work a little, and yet after rise and settle on some other place, or go to their mother hive again; and sometimes (I suppose when they have had a previous habitation fixed on) they will fly clear off, therefore keep a watchful eye over them till the heat of the day is over, when it may be presumed they will not rise again. As soon as your swarm is fairly up in their new house, then place them on a board and carry them cautiously to where you desire them to stand, for the sooner they are set in their stance the sooner will they be acquainted with it: indeed a few stragglers will fly about the place where they were first set down on the sheet, but they will soon either find out the swarm, or return to their mother hive, any of which will be no loss. As soon as you have set down the swarm in its proper stance, let her stand

the bees to it the better; the doing of which can do no hurt, but I seldom use them, as seeing they do little, if any good.

stand with the cloth on her till night, in order to keep off the too great heat of the sun from incommoding the bees; then at night draw a little lime mixed with hair all around the skirts of the hive, (except the entry) which will fix her to the board, and also prevent the access of cold or vermin from going into her; then cover her with three divets or turfs to defend her from rain or too much heat till harvest.

C A S E T H I R D.

When a swarm comes off a hive, and some of them return to her again, (by any cause whatever) and thereby the swarm is too small, then drive some of the bees out of the stock, as directed, page 81, and reinforce the swarm with bees, as directed, page 83.

C A S E F O U R T H.

If a swarm settle on the trunk of a tree, or side of a wall, or any thing that cannot be brought to the ground, if they are within your reach, take a hive and invert it, and gently press it upwards, so as to inclose as many bees in it as you can, not to bruise them against the tree or wall, then with your hand above the bees, gently pull them down into the hive, and then set down the hive on a sheet in the same manner as in case 2d; and if the queen be in the hive, as probably she will, the remaining bees and those that are flying about will soon gather to her; but should a good many bees return again to the place, as sometimes they do, although they want a queen,
then

then pull them into another empty hive as formerly, and set them on the sheet, just beside the other hive, with an open edge next it, and they will soon run all into the hive that contains the queen: any that flies about or may light again on the tree or wall, may be disturbed with a twig or weed, and the noise in the hive will soon call them home.

C A S E F I F T H.

A swarm hanging on a small branch of a tree may be cut down or shaken into a hive or cloth.

C A S E S I X T H.

Sometimes a swarm settles so high on the branch of a tree that it is not easily come at, a long ladder may be used, or one that is a good climber may speel the tree, and get as near it as his prudence will direct; then fix a small rope around the branch, and next cut it through with a very sharp knife or fine saw, and tow it down to a sheet as in other cases; but if you cannot get it cut down, shake the bees off the branch, and it may perhaps dispose them to settle on some more convenient place, where you can get at them with more ease.

C A S E S E V E N T H.

Sometimes a swarm will divide and settle on different places, but if they are allowed a little time, they which want a queen will gradually arise and join those who have one; but should
they

they continue in two different parts, they may be hived separately, and if they both still continue in their hives, it is a sign each one has a queen, and thereby will if permitted make two different hives. In this case if you have two old hives that have not swarmed, but are very full of bees, then drive all the bees out of them, as directed in page 81, into two empty hives, each stall's bees in a hive by itself, and they will make two large and good swarms: then set them down, each swarm where they stood before, when in possession of their own hive; next put the two small swarms on the old stalls, and they will be very happy to find such an agreeable change of fortune; and give each one of the stalls a small entry to keep heat in the hive, as in other cases of a similar nature. When you take the bees out of your old hive, you will see if any of them have a royal cell, (you will know it by the description given of it in page 45) which if they have, you may keep the queen of one of the small swarms for any other use, and put on the common bees, which will soon hatch out the royal cell, and thereby get a queen to the old hive; or you may take out the royal cell and fix it in a lying-out hive, (the same way you was directed to fix in a piece comb to breed a queen of in page 146) which will soon get her a queen and cause her to swarm: but should you have no old lying-out stalls to exchange their bees with the two small swarms, then put both the small swarms together in one hive, which will make a good one; do it in this manner, take the hive that has the smallest swarm in it, turn her up, and cause the bees to fall a running in
the

the hive, by which you will discover the queen; then cover her, along with a hundred or so of her companions, with a drinking glass, and she and them will run to the top of it; then lift the glass out of the hive, and place it on a handkerchief, and keep the queen and her companions in it close prisoners. Next take the common bees in the hive and turn it up, and set the other swarm on it mouth to mouth, and they will soon unite in the upper hive; or you may with a smart stroke on the hive, shake out the common bees on a sheet, and immediately cover them with the larger swarm, and they will soon run into it *. Next take the queen with her companions,

* This is the only way of uniting swarms, by taking away one of the queens; (let Mr. Keys say what he pleases, page 162) for should they be put together, having both the queens, a dreadful battle often happens until one of the queens is slain; although I grant that sometimes they will kill one of the queens, and perhaps not a dozen of common bees; but there is no need for running the smallest risk, when, should you have your wish, you will be no profitter; besides you save a queen for further use, if a hive should need one: therefore when directing to unite two swarms, I always mean the common bees of one of the swarms to be put to the other swarm, and it is not properly two families joined in one, seeing they have only one mother; but the common bees coming to them like orphans without a mother, in an humble supplicating manner, seldom but find grace, and are received into favour, and partake of the privileges of the family; whereas when they come with a mother, they want to defend her, and murder all the native bees, and the natives mean to kill the whole invading family.

companions, and put in a box with small holes in it sufficient to admit air, but not so large as to permit the bees to escape. In this box a little piece honey comb should be put to supply the bees with food till you perhaps may have need of the queen to put on an old hive, or to any other swarm. In this way you may preserve a queen during all swarming time, which may sometimes be v. y useful should a queen be wanted. The box with the prisoners in it should be kept in some moderately warm place, to keep the bees safe from cold; sometimes I have kept a queen and about 100 attendants with her for several days in a thin lawn handkerchief, tied in the manner of a purse, with the bees in the middle of it, by which I could see the state of them through it.

C A S E E I G H T H.

If a hive be not ripe (that is not very full of bees) and yet swarm, then both herself and swarm will have few bees in them; then if you have two old hives that are full of bees, you may exchange one of their bees with the small swarm bees, and exchange the other strong old hive's bees with the weak live that swarmed bees, in the same manner, you are directed to change them in the preceding case: or you may reinforce both the weak mother and the swarm that came from her, as directed, page 83, if you can get common bees from some very strong hives that can spare them without hurting themselves: or you may take all the bees out of the old hive, and secure the queen prisoner, as directed

rected in the preceding case; then put all the old hive's common bees to the small swarm, which will make her a good hive; then turn up one of your very strong hives, and give her some raps on the sides, and carry her to two or three yards distance; then set down the old hive that is empty of bees, but full of maggots, where the strong one stood, which will receive the bees of the strong hive which was in the fields, and also those that flew out of her when turned up, carried, and rapped on; which will supply the stall with bees, and give her a little entry, and at night put the prisoner queen to her. But should you have no bees to do any of the above ways, you may take the swarm's queen prisoner, and return the common bees to their mother hive again; for in this case one is better than two.

C A S E N I N T H.

A swarm, when off, sometimes, though seldom, (I suppose by the queen mistaking the hive) will go on to another living hive standing near her, and then generally a dreadful battle takes place, and perhaps the stranger queen is seized on in an instant by the native bees, and murdered without a fair trial: in such a time I have seen more than a hundred bees all wrapt together about the bigness of a small apple around a queen in such a firm manner, that I would had great difficulty to separate them from her. Some writers say, they are her enemies which encompass her, each one of which is mad to be first at her with their spear. It is probable

probable it may be the case, that they are enemies that surround her in order for her death; but perhaps also her friends may encompass her to preserve her from the rage and fury of her enemies. Sometimes I have separated them from her, and taken her prisoner without the least wound. However, if ever you see at any time a bunch of bees wrapt close together, then you are sure of a queen there; then tear asunder the common bees immediately, and make the queen your prisoner; and as soon as the great heat and hurry is over, you may put the prisoner queen to the hive that needs her. As soon as a swarm goes on another hive, and they appear to fight; then seize the moment and turn up the hive, and if you can get both of the queens make them prisoners: and next take all the bees out of the old hive, and put them in five or six different hives; then set down the old hive on her stance again, and take the hives containing the bees only, and set them near the old hive the swarm came off, and those bees that fly away will probably go to their mother hives: but should some quantity of them remain peaceably in one of the hives they were put in, as probably they may, considering the fright they have got, you may offer one of the queens to them, first wetting her a little to prevent her flying when you put her to them; and if they appear to be fond of her, and creep about her in a friendly manner, then you may let her stay with them; for if they do not kill her at first they never will do it, but live in the greatest harmony and love with her ever after: then you may let her stand or night, and reinforce her.

her with more bees from the two old hives, which of either can spare them best: but if the bees when you offer the queen to them, instead of receiving her kindly, should run to her in a rage, and offer to sting her, you must immediately take her from them again, and let them stay or night till they are sensible that they want a queen; then offer her to them again, and they will receive her gladly: and as soon as a good many of the bees are gone back to the old hive that you took them all out of, you may return her the other queen, first wetting her wings, and if she is the native one of that hive, they will receive her with joy; but if she is the stranger queen, (for it is not easy known which one belonged to the swarm or hive; if one is larger than the other put her to the old hive, and the smallest to the swarm) they perhaps may be more sulky to her, in which case take her from them, and again keep her till night, when they will be as glad of her return as you are of giving her to them: but if when you take all the bees out of the old hive, you only get one queen, the other being killed in the fray, or perhaps had not gone on with the swarm, or some way had escaped during the battle. Then if your old hive that you took the bees out of, had a royal cell in her, she will do without a queen, and the single queen may still be put to the swarm; but if she had no royal cell, and you have no other prisoner queen to supply; then you must return her to the old hive, and the hives containing only the bees, may be turned up and disturbed now and then, and they will probably fly each one to their native hives.

C A S E T E N T H.

Many times a swarm will come off and turn again, and go on to her mother hive, and sometimes will come clear off and settle on some place, and go up to a hive, and yet come all out of it again, and go back to their mother hive; and they will sometimes do that for sundry days running. I have known them do it five or six different times, and yet settle in an empty hive and do well at last: perhaps the queen had not come along with them, therefore whenever a swarm comes off, and returns to her mother hive again, then directly turn her up and drive all her bees (by rapping on her, as directed in page 81) into two empty hives equally divided, then search diligently for two queens, which if you find, put one of them among the bees in one of the hives, which will make a swarm; which place where the mother hive stood, then put the other queen among the bees in the other hive, and return them to the old hive, by turning up the hive with the bees, and placing the old stock on it, they will soon run up; and you may set the stock any part you please, but keep the swarm where her mother hive stood; but in case you cannot find two queens, but find only one and a royal cell, then put the queen and the half of the commons in a hive which will be a swarm, and the other half of the commons being put on the old stock having a royal cell in it will do very well, and soon get a queen: but if when searching the bees and stock for queens and royal cells, only one queen be

found, and no royal cell, in this case a queen has probably fallen on the ground when flying, and the bees have lost her, and so returned to their mother hive again. Then if you have no spare queen or royal cell to assist here, in this case you must put them all on the stall again, and give her a large eek, and she will make a good colony.

C A S E E L E V E N T H.

If a swarm settle among the thick twisted branches of a hedge so as she cannot be cut down, then with a sharp knife cut some branches off above the swarm the best way you can, then place a hive over them, and cause one to hold it firm, and with a hammer rattle on the root of the thorns which will shake the bees and cause them to run up to the hive, also now and then stirr the bees with a stick, all which will make them run up the sooner, and when they are mostly up, the hive may be elevated a little above them, by which the bees will ascend the faster; and as soon as they are mostly up, set down the hive near by, and with a weed brush off the remaining bees, and the noise of those in the hive will call them home.

C A S E T W E L F T H.

Sometimes, especially in second or third swarms, there will be two or three princesses go off with them, and if they settle all in one cluster, and go up in one hive, they will sometimes fight a good deal before they get determined which

which princess shall be their Queen, and the supernumerary ones slain. As soon as you see a swarm fighting in this manner, you may conclude there are more Queens than one among them; then search for Queens, and take them all away but one, by which you may prevent much slaughter, and get a Queen or two, which you perhaps may have use for in some of your other hives.

C A S E T H I R T E E N T H.

If a swarm go into a hollow tree, as sometimes they will, then with a chissel and mallet cut a hole in the tree as near as can be to the upper part of the hollow, then place an empty hive upon the hole, and strike the tree all around with the mallet pretty forcibly, which noise and disturbance, may make them run out at the hole into the empty hive, or dispose them to fly to some branch of a tree, and settle on it, where they may be cut down, and lodged in a hive as in other cases. and if they were long in the tree, the hive after they are lodged in it should be placed near it to stand during that day, to receive the stragglers. I have taken a swarm out of a hollow tree after they were frightened into good humour, when I could get at them in handfuls and spoonfuls, and put them in a hive as easily as if they had been all gooseberries, and scarce received a sting, unless I had accidentally pressed some of them against the tree, or those that had been at the fields, upon their return home, would be greatly enraged when they saw their habitation
so

so much altered, they would vented their spite at me.

C A S E F O U R T E E N T H.

If a hive lies long out for want of room, (but indeed none should be suffered to do so above eight days) but does not swarm, it is a sign she has not a young queen bred yet, as noticed in page 165; in this case, if you have a small swarm to exchange bees for bees with, as directed in case 7th, it will do very well; or you may take a large quantity of her common bees, and reinforce a weak hive or swarm with; or if you can have a spare queen, or royal cell, you may take a swarm from her, and put the said queen or cell to the old hive, or you may give her a large eek, and so make a colony of her, which will be as profitable and pleasant a way as any, and easy done, as you will see in page 163, besides if she have a royal cell coming forward, she will still swarm, and therefore must be watched although she be eeked.

The way to make an eek is this, cut four rolls of the under part of an old hive, which will make one, or make a new eek on purpose of the same wideness of the hive you want enlarged, and cut a door-way in it the same size as the one in the hive; then place a board with the eek on it at the side of the hive about the middle of the day or any other time when the bees are throngest at work, then gently lift up the hive from her board, and immediately set it on the eek, and few or no bees will be crushed between the hive and eek, as the most part of them

them will be at work in the fields ; - besides they are not so quarrellsome at this time of the day when they are engaged in business as they are at night when all are in the hive and their guards set: then set the hive in her stance again, and at night draw a little lime around the joinings to fix the eek to the hive, and keep out vermin and cold.

C A S E F I F T E E N T H .

Before bees swarm the second or third time, they do not lie out in clusters about the hive or board, but whenever ready, come rushing off even in indifferent days; yet we have more certain signs of the time they will cast their after swarms than when they will do it the first time: nay if the weather be good, we can almost set the hour they will do it, for if you place your ear to a hive at night, about ten or twelve days after her first swarm came off, you will hear a sound commonly called tolling, which is made by the young princess, in order perhaps to warn, or rather beseech her companions to make ready for a march along with her. I cannot pretend says one to describe this sound fully to your understanding, it pronounces as it were *peep, peep, peep*, a dozen or twenty times successively in one breath; then stops, calls the same way again, and so on somewhat like a hen's chicken peeping for its dam when it has lost her. As many princesses as there are in a hive, there are so many different sounds; sometimes I have heard their sound from all quarters in the hive, and as it were answering one another;
some

some crying, *peep, peep, peep*, in a treble manner, as already said; and others answering in a more hoarse manner as it were the bass. Whenever you hear these sounds in a hive, you may depend on a swarm in a day or two if the weather be good. The first night they are observed they sound but low, and seldom, and not often cast the next day, but the second night they sound louder and oftener, insomuch that you will sometimes hear them standing two or three yards from the hive, and the next day you are sure of a swarm if the weather answer. It is delightful, says *Thorley*, to hear those peculiar and musical sounds or notes being an eight or chord, which is truly harmonious. Those sounds are scarce ever heard before a first swarm, I believe not one in sixty calls: the reason I suppose is, they have only one queen bred commonly to go off with the first swarm; and as said in page 161, they will sometimes send off the old queen with the first swarm or ever the young queen be out of the pregnant royal cell: whereas before they swarm a second or third time, sometimes they will have four or five queens and royal cells in their hive, by which a queen or royal cell may be got to put to any hive that needs one.

C A S E S I X T E E N T H.

If a swarm go into a hollow of a wall, take out some stones opposite to her, till you can see the bees, and then pull them into a hive, or rap on the wall with a mallet, which may frighten the bees so as to dispose them to rise and settle

settle on some place where they will be easier hived.

From what has been said concerning the above cases, there will be little need for making artificial swarms; neither am I very fond of giving directions how to make bees swarm, unless in very particular cases, in which it may be very profitable. If hives are lying much out for want of room, and thereby spending fine weather and doing little work, then they should be either eeked or an artificial swarm taken from them, in case you have queens or royal cells to supply both the old hive and her swarm with.

The way to take a swarm from a hive is this, lift the stall off the board, and place an empty hive over the bees that remain on the board, then carry the stall six or eight yards off, and turn it up, and drive all the bees, queen and all out of it, as directed in page 81; then when all the bees are out of the stall you will see if she has any royal cells in her, which if she has, it will soon come forward to be a queen to her, and you may lift off the empty hive, and set down the stall on her own stance again, and the common bees will soon rush into her; then set down the swarm by her side, within a foot of her, and sometimes set the swarm in the stall's stance, and the stall in the swarm's stance, taking great care that the bees be properly divided. There should be twice as many in the swarm as there are in the stall, for the stall having a great many maggots in the cells, will soon turn into bees, and thereby increase the number in her: or as soon as you are certain that there is a queen in the swarm (as it can
scarc

scarce miss, seeing the whole bees were drove out of the stall) by their beginning to work; then you may carry her, or rather the stall, to the distance of a mile, and let her stand during summer if convenient; or bring her back in eight days, by which you will save the trouble of changing the hives, and they will work without any interruption. But suppose the old stall has a royal cell in her, if you have a spare queen by you, put her to the stall at night, in the same way, as directed in case 9th, and the bees will receive her kindly, being now sensible they want one, and are mourning for her loss. But in case you have neither a spare queen, nor the stall a royal cell in her, then you must return all the bees again to the stall, and give her a large eek, and so make a colony of her, which is as profitable and as easy done.

Perhaps the reader will say, supposing a hive having in her a vast multitude of common bees and only one queen, by taking out the queen and two thirds of the bees, they will compose a swarm; and the third of the common bees being left in the stalls will build a royal cell, and thereby get themselves a queen: true so they would, and it may be done if very soon in the season, and the old stock do well too; for an artificial swarm is every whit as good as a natural one if they be equal in number of bees and swarmed both in the same day; but if the season be far gone, perhaps the middle of *July*, and the old hive be left without either a queen or royal cell in her; then she will have a royal cell to build, and it will be twenty-five days or she can have a young queen brought forward and fit for laying

laying eggs, and after that other twenty-five days or any of her offspring can be fit for labour, by which time it is the first week of September, and the season for gathering honey is gone, and the hive grows commonly daily lighter after she has swarmed, and also there will be few bees bred, and the hive thereby rendered unfit for keeping for a stall.

If you are very keen of having queens bred, you will see in page 43, how I made a hive breed me some to supply me with. Small thriving hives commonly swarm soon the first time, and about nine or ten days after they often found, in order to swarm again; in which time there are four or five queens and royal cells in her. At least there will be two queens, therefore if you want queens or royal cells you may drive all her bees out, and take all her queens or royal cells from her, but only one to supply herself with; which is a better way than to take a queen from a hive in order to cause the bees to breed more queens. And in no case suffer a hive to want a queen, except when you take one from a hive in order to cause the hive to breed more for some very needful use.

It may be useful and amusing to know the weights and number of different swarms. 'It has been found, says *Butler*, that a larger number than 40 or 50,000 will not thrive together in one hive. Swarms often amount to 30,000; a large swarm may weigh eight pounds, and gradually less to one pound: consequently a very good one weighs five or six pounds, a moderate one four pounds. No swarm less than this should be kept, but united with

'with others.' Mr. Wildman says, 4928 bees weigh a pound, and that 20000 bees compose a very large swarm. I am of opinion that a swarm that has 15000 bees in her will do very well in a single hive, if not too late in the season: but I have had above 30000 in a swarm: the more always the better.

Most all authors advise to kill the drones (or males as they call them) as soon as the top swarm is gone off. Surprising! how inconsistent with themselves to teach a man to kill all the fathers of his hives in order to make them thrive the better: what incoherence is here, though I cannot agree with them as to their sex, yet I give the same advice with respect to killing of drones. As soon therefore as the top swarm is gone off a hive, the next fine day about eleven o'clock sit down at her side, and as the drones come out at the entry of the hive, (in order to fly off) lay your fore finger on their back, and press them to the board, and in this way you may kill a 100 of them in a short time. You will see another way how to kill them in page 61. The drones are very great eaters and wasters of honey, being bigger than the common bees they take more to support them, and perhaps they have that instinct to know their days will soon be ended, and that they have no need to steward out the honey for the winter, as they will not be suffered to live till that time, as the common bees will soon kill them. I think, supposing the drones were allowed to live out all their days, they would not be long; for they appear to be more tender insects than bees: yet in some hives that want their queens, the drones

are

are permitted to live, and they have been seen, though very rare, in such hives after *Martinmas*.

C H A P. XXI.

HOW TO TAKE HONEY OUT OF HIVES IN SUMMER WITHOUT DESTROYING THE BEES.

A GOOD many directions have been given by different authors how to take a part of the honey combs out of rich hives in summer, and thereby the sooner to share of their treasures. Those that keep bees in colonies, that is one family of them in two or three different boxes; they take the box that is fullest of honey from them at a time, leaving the other one or two boxes, and perhaps if need be, adding another to them for the bees to work in. And those that keep them in single hives, drive the bees all out of them, and then cut out as many of the richest combs as they think the hive can spare; then return the bees to the hive, which replenish it again with combs.

But there is no profit but rather loss by any of these methods, for it disturbs and discourages the bees greatly; and in the boxes taken there is oftentimes young in the cells, which are generally lost: besides it is attended with a deal of trouble; and if the season turns bad after the hive is robbed, it hinders the bees from replenishing the hive or colony with combs and honey, and

thereby prevents them from being fit for stalls. Nor need the owner think his hives turning rich of honey and numerous of bees will thereby turn lazy: for the contrary is the case, as was formerly said in page 16; the more rich a hive is, it is the keener on riches, and the more numerous, the keener on encreasing their number. Therefore be assured of this, that there is nothing more profitable and delightfome, than to have an exceeding great multitude of bees in a capacious hive carrying on their works in a natural way with the greatest harmony and speed, not unlike some stately oak growing, and flourishing in its native soil with the greatest luxuriency; where the pruner's knife never comes. Therefore wait patiently till harvest, and you will come with the greatest ease to the whole lump of honey in the hive, which is a far better way. But should you be very keen to taste a little fine honey in summer you shall be gratified. Therefore in the height of the day when the bees are throngest at work, and thereby fewest in the hive; pitch upon the heaviest of your last year's swarms, and carry her to some distance from her stance, eight or ten yards or so, and place an empty hive where she stood, to receive and amuse the bees during your operation: then turn up the hive and rap her smartly on the sides, (first having your armour on) by which the bees will fly thick to the empty hive in their own stance: then at one view you will see the richest combs at the side of the hive, where there will be probably the fewest bees: then with a knife cut them out the best way your prudence will direct; then turn up the hive and set her

on

on a board again, and let her drip three or four minutes; then set her on another dry board, and remove the empty hive, and place the stall on her own stance, and the bees will fly thick to her again, and soon lick up the spilt honey. Then about an hour or two after place her on her own board, by which the crumbles of wax that the bees had brought down to the other will be removed. Many others advise to drive the whole bees out of the hive in order to rob her the easier. Those who chuse that way may do it, but I esteem the former way the best, as it keeps the queen in the hive, and does not disturb the young, by loosening the combs which are left in the hive, and I can do it and scarcely kill a score of common bees; for the rapping makes them run to one side, and I chuse the other, and it is done in a few minutes; but if there are a very great deal of bees in her, the half of them or so may be drove into an empty hive. And as soon as ever you see a rich comb clear of bees seize it. When the edges of the combs you want are loosened from the hive, by turning up the hive, the weight of the comb will make it fall down into a dish placed below.

A new swarm must not be thus robbed, nor must she be laid on her broad-side or her mouth uppermost, for by doing that I have often seen the fine free young combs both containing honey and young bees, sway all to the under side of the hive, and thereby loosened; and when set on their board again, they would have fallen down on it, and sometimes totally ruined the whole hive.

We have accounts from *Egypt* and *France* and some other countries, that they remove their bees from those fields the flowers of which are faded, to others where they are yet in bloom; (in order for the bees to collect the more honey) and sometimes they will carry them a great distance for fresh flowers to feed on. I have often done that way with my bees and had satisfaction, and other times when the weather had changed had all my trouble lost. In spring I sometimes place hives among whins, in summer in the middle of a clover field, and in *August* I set them in a heather muir. When they are removed from a poor pasture to a good one, they are very fond of so agreeable a change, and carry very brisk. Those who choose to remove them for better pasture, if the weather be good, are sure to be profitters; but should the weather turn bad, they only lose their trouble of removing, and in this case I leave every one to their own choice; only this I affirm, that the nearer the pasture they will carry the faster, and removing in spring as formerly said, is an excellent preservative from robbers. When a hive is to be removed, do it in cloudy or cold days when the bees stir not out of their hives, or in the evenings: they may be carried on a handbarrow between two men, two or three hives at a time; or a man may carry one upon his head. In winter three or four hives may be carried on one horse with kreens, if properly tied up in sheets, so as not a bee may get out; for if they did, they would sting the horse and make him fall a jumping, which would remove the hives more and more off their boards, and thereby

thereby more bees would get out of the hives, and at the horse and sting him, which would enrage him so, that he would jump and kick and run away, and readily ruin all your hives. Beware also of carrying hives in carriages, for the jolting of them brings down the combs often, and bruises both them and the bees; and if any bees get at the horses to sting them, ten to one but the carriage be overturned, and all your hives lost; and perhaps yourself and horses suffer in the calamity.

In the latter end of summer or beginning of harvest, when the flowers begin to turn scarce in the neighbourhood, bees will again fall a robbing one another; and wasps (in some places) will also attack the hives; therefore their entry should be reduced to only half an inch long, and as high, by which few bees will the easier defend it; and those hives that have few bees in them should be immediately killed.

C H A P. X^{II}.

ARGUMENTS AGAINST UNITING BEES FOR STALLS.

THE bulk of authors declare their abhorrence of killing bees in harvest in order to come at their honey, exclaiming loudly against such an unhuman, barbarous, and cruel practice, as they are pleased to call it; asserting also with
lame

proof, that such a practice is opposite to the owner's interest. I shall give you a little of their stuff on that head, and let you see how they contradict themselves; and next offer my reasons for which I still jog on in the old fashion of killing bees in order to come at their honey. The author of the natural history of bees makes his *Clarissa* say, 'Methinks it is
' whimsical enough that a man when he eats his
' ox or sheep, should imagine he possesses him-
' self of a thing to which he had a just and law-
' ful title.'

Eugen, 'The lion may with equal justice fancy
' himself impowered to feed upon men, and the
' wolf on sheep; but it is my opinion that nei-
' ther the one nor the other could find any other
' original title of their sovereignty, than force or
' cunning. But let us engage no further in a
' question, as this would raise up a multitude
' of gainfayers.'—— When speaking of them
that kill the bees, he says, 'The murderers a-
' bove mentioned add, that bees would devour
' during winter all the honey stored by them in
' summer. By what name would you call a
' peasant who would kill his goat merely that he
' might come at all the milk contained in the
' bladder of that animal?' Sage Sir, I would call
him a fool at least, if not worse; but were he
to kill the goat for the flesh it would alter the
case.—— When *Eugenia* is grown a little calmer
he says, 'it must be confessed that our insects
' would eat the greatest part of such honey, and
' perhaps all, since they hoard it up merely as
' provision for themselves.'

Dear

Dear Sir, seeing they eat the most part of their provision, if not all, in winter; certainly if take a part of it from them they would die of famine, which is none of the easiest deaths; besides all the honey they had in their hives in harvest would be lost too. Mr. *Thorley* says, page 150, on this head, 'From the long observations of these very wonderful creatures, and their inimitable excellencies, together with their great usefulness to mankind, I am become one of their greatest admirers and a public advocate for them, most solemnly protesting against all that notorious ingratitude of their cruel owners, who not contented with all their treasure, collected with infinite pains and many perils, devote them to destruction without any distinction to their own great loss.'

'Is no regard due to these creatures of God, which are so excellent in themselves, and serviceable to men; when the following pages will make it appear with how little trouble and without any expence the owner may come at their riches with safety to their lives. Those who shall hereafter doom them to common death, must be altogether without excuse.'

'No new swarms or stocks should be thus united *, except very late ones and casts which

* I suppose he means no swarms or stocks that have plenty honey and bees in them, and so fit for stalls, should be thus united. In this he is very right, for such hives will make good stalls as they are; but if their honey only serve their own bees till next honey season, if put some thousands of more bees to them in harvest, they would soon be gone with it, (perhaps by

214 *Bees should not be united for Stalls.*

‘ which have not gained a sufficient quantity of
‘ honey for their winter store; such I always u-
‘ nite to save their lives.’

‘ Hives or stocks which have swarmed once
‘ or twice, consequently reduced in their num-
‘ bers, are the fittest to be joined together,
‘ which will greatly strengthen and improve
‘ them †.’

Mr. *Thomas Wildman* says, page 169, ‘ Were
‘ we to kill the hen for the egg, the cow for the
‘ milk, or the sheep for the fleece it bears, eve-
‘ ry one would instantly see how much we should
‘ act contrary to our own interest.’ All true,
Mr. *Wildman*, but should we kill some of those
creatures in harvest which we can spare merely
for their flesh: (especially when we could not
maintain them through winter, and so they
would die of famine) perhaps you might taste
with us, and think it not such imprudent con-
duct.

But to come to the point, let it be supposed a
hive in harvest that has 16000 bees in her, will
take 20 lb. of honey ‡ to maintain her till June;
it

by *March*) and consequently die of famine; and in-
stead of being bettered by adding bees to them, they
would be ruined.

† The reader will certainly observe a great blunder
here, if one of those weak hives or casts have not a
sufficiency of honey in her own hive to supply her
with in winter, and thereby perhaps die of famine in
March: certainly if add the bees of another hive to
her, she would sooner eat all the honey, and thereby
die the sooner of famine.

‡ A hive that is 30 lb. wt. I compute will have 20
lb. of honey in her; the other 10 lb. I allow for the
weight of bees, wax, and hive.

it is plain to every one, that if add other 8 or 16000 bees to her, she will eat all her honey long before the foresaid time; and consequently die of famine.

Again, should a man have two weak hives that have each of them 8000 bees, but only 10 lb. of honey in them; then if put the bees of both the said hives in one of them, there would be 16000 bees in her, and only 10 lb. of honey to maintain them with, which would only maintain them the half of the time till the honey season. According to this, good stalls (as agreed by all) need no uniting; and light hives have not honey enough to support their own bees, and far less to maintain their neighbours too if added to them.

* Again, a man has twelve good heavy hives, every one of which as they presently are, will make an excellent stall, each having 16000 bees in her; a sufficient number to eat all the honey in a hive that is 30 lb. wt. and he wants to take the honey of six of them for his use, and to keep the other six for stalls. I would ask the *Frenchman*, *Thorley*, and *Wildman*, what must he do with the bees of the six hives determined to be taken, seeing the other six set aside for stalls, have as many bees in them as they are able to maintain?

It is well known that after a very bad summer, a great many hives are very light, and perhaps a man has 30 hives, 10 of which are only fit for stalls, which he very wisely keeps for that purpose; the other twenty have very little honey at harvest, and a good number of bees in each of them. Please, gentlemen, what must he do

do with the bees of the forlorn twenty light hives? must he force them all on the 10 stalls, which would starve them altogether by a lingering death, and thereby become a broken bee-master; or must he end their days in three minutes, and preserve the other 10 stalls for further use?

Upon the whole, a hive that is 30 lb. wt. in harvest, with a sufficiency of bees in her, as one of such a weight commonly has, she will make a good stall, and need no more trouble but to cover her well, &c. as directed in page 79. But if in harvest one should have a hive that is 30 lb. wt. but very few bees in her, which will very seldom be the case, he may drive all her own bees out, as directed in page 81, and put a large swarm of bees on her, (which he may take out of any light hive) and so she will have a sufficient number.

Or he may reinforce her with bees, as directed in page 83, but by no means do either as long as he can get a hive for a stall, that is both 30 lb. wt. and plenty bees of her own.

As it is impossible for bees to live when they are deprived of their food, we are under a necessity to kill all those hives in harvest that have not a sufficiency to maintain them till the flower season return.

The time of killing of hives is sometimes sooner and sometimes later, according to the earliness or lateness of the flowers in the neighbourhood, or the goodness or badness of the weather. I have known hives waste their honey and turn lighter after the first week of *August*. And other times I have seen them when
the

weather was good, and near heather, work keen all the month of *August*, and turn daily heavier. Therefore the honey harvest is like the corn one, sooner and later, in different years. As a general direction, whenever the weather sets in cloudy or rainy about the middle of *August*, or whenever your bees give almost over work, for though they carry some at this season, their family being commonly very large, perhaps for one lb. of honey they gather, they may eat two. Therefore at this time, in the first place choose your stalls according to the directions given in chap. 11. for that purpose, to which I refer you. Then put a mark on every stall you have chosen for yourself, then sell or kill all the rest whether good or bad; for the sooner the honey is made, the better will it run out, and there will be the fewer bees to molest your stalls in the robbing way.

You will remember in page 152, I advised you to drive the bees out of very light hives in harvest, and keep them in order to put swarms in next summer. Having directed you how to choose your stall hives, there is no need to direct what to kill, seeing all the rest may be either sold or killed.

C H A P. XXIII.OF KILLING BEES, AND SEPARATING THE HONEY AND WAX.

AS to the killing of the bees of those hives you design to take, the best way is with brimstone; prepare a few rags dipped in melted brimstone, then dig a hole in the ground a foot and a half deep, some narrower than the mouth of the hive; then take two small pieces of wood eight inches long, and make a slit in one end of each of them, into which thrust the brimstone matches, then thrust the pieces of wood containing the matches into the side of the hole, and kindle the matches with a candle or coal, then nimbly place the hive over it, and lay a little earth around the skirts of the hive to keep in the smoke for ten or twelve minutes; in which time frequently beat the hive with your hand to cause the bees to fall down. I have wrote this with a deal of feeling and reluctance, as much as when I see a harmless sheep or any other innocent creature killed for the use of man; for during the whole year I so much sympathise with the bees, that even when one stings me I rub it off, but never kills a single one; and suppose I see my neighbour's bees robbing mine, I never destroy one of them. I generally drive the bees out of a hive when I design

sign to take her, as in page 81, and then smoak them after. My reason for it is, when a hive is smoaked, a good many bees lodge in the cells and sides of the combs; and thereby files and loses some of the honey; besides some of them being only half dead oftentimes sting those that are making the honey. The reader may do either of which he pleases. All your utensils for the honey having been before prepared, such as large dishes, jars, sieves, knives, and spoons; you are immediately to fall to work while the honey is warm, as then it will run more quickly out. To further this intention the hive should be brought into a warm room, then with a pair of pinchers grip the end of the sticks in the hive, and give them a twist round which will loosen them; then pull them all out, and with a knife loose the edges of the combs from the hive all around, and give the hive a smart knock on the floor on one of the sides to which the broad-side of the combs is opposite, ~~which will make the combs fall to that side~~; then turn the hive and give it another knock on the opposite side, which will effectually loosen all the combs which you could not get so well at with your knife; then keep the hive still on its broad side, and the combs will lie all one above another; then take always the uppermost comb off first, and should any dead bees be on it blow or brush them off; then divide it into three parts, and lay the empty combs first by themselves; next, the combs containing eggs or maggots by themselves, and then lay the fine sealed up combs on a dish by themselves, ordering an assistant to cut them into thin slices, first observing to pair off all the sealed

220 *Killing Bees, separating the Honey, &c.*

mouths of the cells in order that the honey may run the sooner out. The combs should be laid in this state on sieves or some other contrivance which will afford the honey a free passage; it will run quite clear, and the honey thus obtained should be kept by itself, as being the purest and best.

Those combs which may be partly filled with young bees, bee-bread and honey may be given to hives to take their honey out of them, in the way directed in page 113, which is the best use they can be put to, and the bees will soon make them honeyless.

After the fine combs will run no more, put them in a pan over a slow fire, constantly stirring them about with your hand till they are more than milk warm; then put them in a strong canvas bag and squeeze out the honey, which you may keep for feeding your bees or any external use.

All those combs which the honey was squeezed from may be steeped in water and made into mead; or you may steep the combs in water for that purpose after the finest of the honey is run out without squeezing for more.

Now your combs being all honeyless, are fit for making wax. The way I do is very simple, I put the combs in a kettle with a sufficient quantity of water, and make them boil over a slow fire for 40 minutes or so (often stirring them about) in which time they are all melted; then I lay a pair of tongs or so over a small tub with some water in it, and set a strong made cullender (which is flat on the under side with round holes in it) on the tongs; then with a
ladle

ladle I put the melted combs in the cullender, and press them down with a piece wood made on purpose, flat on the under side, which squeezes out the thin wax into the tub below, and the dross remains in the cullender. I generally boil the dross again a second time, and squeeze for more wax. Indeed the wax in this way cannot be got entirely out from the dross, neither can it in any other way that ever I saw tried or heard of. All that is left among the dross in my way of separating it is very insignificant, and will not pay the charge of any further trouble *.

After the wax is cold in the tub I put it again in the kettle among clean water, and melt and pour it in a bowl wider at the top than bottom, and skim off any dross that may float on the top of it, and let it stand in some warm part to cool slowly, which prevents cracking. Then I take out the cake of wax, and pair off all the dross in the underside of it, till there be nothing but clean wax, and then it is fit for the merchant.

* I have tried many other ways in order to get all the wax out of the dross. More than a dozen of years ago I made a press for that end, something like a candle-maker's, which they squeeze the tallow with, but laid it aside. I have squeezed it with bags, but they would never stand the stress long. I have done something like Mr. Key's method, but it did not satisfy either.

C H A P. XXIV.

OF BEES ENEMIES, AND HOW TO GUARD A-
GAINST THEM.

THE three capital enemies to bees are cold, robbers, and famine, to which may be added the mouse: these are enemies that kill many hundreds of hives in this island every year; (other enemies hurt them but rarely) but these are constant murderers if not guarded against.

You have been directed already how to preserve your bees from all those capital enemies in different parts of this book, to which the contents will refer you.

Wasps are enemies to bees, especially in dry warm years, and those hives that are near plantings (where they resort much) are the greatest sufferers by them. But where I live, a wasp is scarcely ever seen at a hive, except some chance time a mother one will appear before a hive in *May*, and offer to go in; but her hoarse voice and fool's coat discover her to the bees, and they banish her from their territories. I know not if ever a hive in my neighbourhood was ever a shilling the worse by wasps: but four or six miles distance from this place fundry hives have been killed by them.

In spring destroy the mother wasps wherever you see them, for by killing one of these, you destroy a whole nest. Also their nests should be
fought

fought out and as many destroyed (by burning, scalding, or drowning) as possible.

If many wasps are seen to attempt any hive in the latter end of summer or beginning of harvest, the entry should be reduced to one half an inch long, and as high, by which the bees will be able to defend it; and those hives that have but few bees in them should be immediately killed and the hives taken, as in page 211. But those hives you design for stalls, if severely attacked, (as is seldom the case that strong hives suffer) may be removed to some place not near plantings, where they may remain till robbing time (by either wasps or bees) is over. Phials having honey or sugar mixed with ale in them, will allure them to it to their own destruction; but in fine days it will also allure the bees and destroy them, and often by placing phials in apiaries it attracts all the wasps in the neighbourhood, and brings many that otherwise would not have come, and makes the cure worse than the disease. This however should be cautiously avoided, in general they are of little service.

Another enemy is a large moth called the wax moth, for the maggots proceeding from it eat the wax for their sustenance. The moth is very attentive to discover any part about the outside of the skirts of the hive where she may conveniently lay her eggs; but if not successful about the outside of the hive, she nimbly runs in at the entry unnoticed by the bees, and lays them there, the egg soon becomes a large white voracious maggot, more than half an inch long, which spins over itself a covering for defence. These maggots turn very numerous in some
hives,

hives, and consume the combs, and discourage the poor bees so much that they will sometimes die of famine or desert the hive.

For my part I never suffered the smallest loss by these invaders, for I never saw any of these maggots in my hives except once, and then I saw only two of them in one hive; nor did I ever hear any person complain of them in this neighbourhood. But about 20 miles off this I once saw a dozen in one hive, and the owner told me that he once had two hives in one year which had as many maggots in them as bees, which was a very loathsome sight, and he burnt both the hives root and branch, bees, combs, honey, hive, and maggots altogether; and in so doing thought he did manfully, but I thought he would have done wiser had he driven all the bees of them into empty hives and made swarms of them, or added them to some other weak hives, and then smoaked the maggots to death, and given his other bee-hives the combs to suck the honey out of, and after made them into wax, and his empty hive would have served another year, by which he would have sustained no loss but the maggots, which he would have esteemed but very small. The poorest hives are forest molled with those as well as other enemies. If you see either in the outside or within the hive any signs of such vermin breeding or bred, destroy them.

Several birds are also enemies of bees, such as the swallow, sparrow, lark, duck, and even hens, I have seen them peck them up; but in general they hurt them very little. Take all ways you can to preserve them from such creatures.

Spiders.

Spiders also destroy many bees, by catching them in their ensnaring nets they kill them. To preserve your bees destroy all their nets which are spread any way about the hive or cover of it.

Earwigs are also enemies, and *Keys* says, they steal in at night to the hive, and drag out bee after bee, sucking out their vitals, and leaving nothing but their skins as so many scalps, emblems of their butchery. They breed between the skirts of the hive and the boards; in which place search for their nests and destroy them.

Noise disturbs bees something, which is remedied by being set in a quiet remote place, bad weather, as wind, rain, cold, heat, &c. which is prevented by the situation of the apiary, and the hives being properly covered, &c.

Ants sometimes make their nests between the hive and covering, 'without molesting or being molested' says *Mr. Wildman*. I never was sensible of them doing any hurt, but I have heard some say that they go into hives in the night and suck out the honey, and that they have seen hives ruined by them. Remove the covers in the latter end of summer, and destroy the ants.

Wood-lice are also destroyers of bees, and they harbour much about old decayed wood which is near them. They should be often sought for and destroyed.

Keep your hives always clean and neat, removing from them all filth or impurity that may at any time gather upon the board, or around the outside of the hives.



